



Nesting Animals of Orissa



Forest Department
Government of Orissa



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WILDLIFE ORGANISATION
Forest Department
Government of Orissa

October 2006

October, 2006

Published by:

Wildlife Organisation,

Forest Department, Govt. of Orissa

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This report may be quoted freely with acknowledgement.

Citation:

Mohanty, S.C.; Singh, L.A.K; Kar, S.K.; Kar, C.S. and M.V. Nair (2006): *Nesting animals of Orissa – 2006*. Wildlife Organisation, Forest Department, Govt. of Orissa, Bhubaneswar.

Photo credits:

Monalisa Bhujabal, Nandakishore Bhujabal,

K. L. Purohit, Muntaz Khan, Gopi G. V., S.K. Jena, L. A. K. Singh,

C. S. Kar, S. K. Kar, Manoj V. Nair, and a long list of various other sources.

Drawings: Raj Kumar, Artist

Computer Setting: Santosh Kumar Sundaray

Front Cover Photos:

Paradise Flycatcher female attending to chicks, Giant squirrel balancing her way to the nest, Estuarine crocodile guarding nest from top.

Back Cover Photo:

Blue throated barbet peeping out of her nest-hole

Designed and printed at:

THIRD EYE COMMUNICATIONS, Bhubaneswar - 751 015

Tel: 0674-2556271, email: thirdeye_india@yahoo.com

CONTENTS

Foreword	
Setting the tone	
Introduction	1
Hairy Matrons (The Nesting Mammals)	3
Feathery warmth (Nesting by birds)	6
Twig nests	7
Nest in tree holes	16
Earth bank tunnel nests	19
Floating or semi aquatic nests	25
Cup nests of grass, fibre, etc.	29
Simple scrapes as ground nests	33
Mud nests	35
Woven, oblong purse-type nests	36
Colonial nesting by water birds	43
Scaly care (Nesting by reptiles)	45
Crocodiles	45
Lizards	51
Snakes	53
Freshwater Terrapins	54
Land Tortoises	55
Marine Turtles	56
On making a nest-friendly garden	59

FOREWORD

When I was not so directly involved with wildlife, the one abiding motif in my mind was the weaver bird. In all my visits to the countryside, the one thing of the outdoors that used to engage my attention was the weaver birds' nests, hanging mostly from palm trees. I had the occasion once to hear the legendary Salim Ali holding forth on the nesting habit of the weaver bird for two consecutive lectures. When, this year, I was groping for a suitable theme for the publication to be released by us during the Wildlife Week, the theme of the 'nests' assumed a very compelling urge. The mass-nesting Olive Ridges and the nesting crocodiles which occupy centre stage in our activities further prompted me to choose the theme of nesting animals, and to present the diversity of nesting habits as a fascinating spectacle. This is the outcome of that inner prompting.

Birds build their nests everywhere—from directly on the ground to the tops of trees. The White throated kingfisher builds its nest in the bank of a river or creek, digging it four feet deep into the bank. Grebes build floating nest on water. Not all birds build their own nests! Some birds put their eggs in the nests of other birds. Such birds are called brood parasites. This can be bad for the bird whose nest gets an extra egg to be hatched. Some cuckoos are brood parasites.

This venture at gathering information of the above kind at one place has given us a chance to refamiliarise ourselves with the peculiar nesting adaptations of many species of birds, reptiles, squirrels, and also of wild boar. My heartfelt felicitations go to Dr. L.A.K. Singh, Dr. Sudhakar Kar, Dr. Chandra Sekhar Kar, and Sri Manoj Nair who have painstakingly pieced together a lot of fascinating information at a very short notice. My affectionate good wishes to Sri Raj Kumar, our own Artist for embellishing this text with his lively sketches.

I dedicate this venture to all my colleagues in the Wildlife Organisation and in the Forest Department of Orissa and hope that they will make use of this booklet to marvel at the great variety that is Nature.

SURESH CHANDRA MOHANTY
PRINCIPAL CCF (WL) & CHIEF WILDLIFE WARDEN



Setting the tone.....

Preparation of a compilation on some nesting animals for release on the occasion of the Wildlife Week-2006 sometimes did appear to be a subtle academic exercise to popularize one of the many facets of the way of life of our faunal marvels.

When we embarked upon the project, nonetheless, it was also an uncomfortable question to answer and fit a title on "Nesting animals..." within the more direct mandates of the Wildlife Headquarters! But as we compiled information from various sources and topped up these with our own observations from the field,— often narrated and deliberated upon with our passion and exuberance, we realized, this title could be one of the many effective approaches to reach the heart and mind of people with a plea for generating compassion for wildlife.

If our purpose is fulfilled, we will be able to avoid serious situations like the need to rescue deserted fledglings, orphaned pups or meeting a cat that has grown big to be a nuisance amid human habitations.

AUTHORS

Wildlife Hd. Qrs., Bhubaneswar
October 2006

INTRODUCTION

"Wildlife" is described under the Wildlife (Protection) Act as 'any animal, aquatic or land vegetation which forms part of any habitat'; and **"Habitat"** includes 'land, water, or vegetation which is the natural home of any wild animal. **"Wild Animal"**, in turn, refers to the animal species listed in various Schedules of the Act, and **"Animal"** includes 'mammals, birds, reptiles, amphibians, fish, other chordates and invertebrates and also includes their young and eggs'.

Therefore, wildlife conservation encompasses conservation of adult, young, eggs and the space these occupy in the habitat. In this context, it is important to know to which part of the habitat an animal or its progeny belong to, and what conservation action could possibly reduce the gap between initial 'reproductive effort' and the final 'reproductive success' of a species and its ecological associates.

Over thousands of years of evolutionary process, species have evolved with behaviour and habit matching with the habitat they are adapted to live comfortably in. But we are accustomed to relate an adult animal or bird to its habitat, and often miss the stages through which procreation has progressed to the summit we see on any particular day.

A Gharial (*Gavialis gangeticus*) has learnt to excavate a nest on high sloppy sandy river banks in summer and carefully lay the eggs in it. The time and space for nesting is such that the hatchlings emerge after about 75 days of incubation but before the nest site is flooded. In a similar pursuit, the Estuarine Crocodile (*Crocodylus porosus*), that experiences tidal floods everyday, constructs a mound for laying the eggs at a height that is safe from inundation.

A Giant squirrel constructs a nest that should be out of reach for langurs which may use the same tree; and a *Varanus* uses a termite mound to lay eggs which await for hatching after eight months in June when food appear in plenty around the mound. The Chameleon excavates a nest on the ground, lays the eggs, then cover and rams the surface with sand using its skinny limbs so that the developing embryo remains safe for the next 8 to 10 months until the winter passes off, rigours of summer cools down and the first shower of rain brings with it the emergence of insects tiny enough for the small hatchlings.

Continuing a race to live on earth is one of the main natural reasons for the existence of any living being. This is the driving force behind evolution of species and survival of the fittest. Accordingly, species have evolved various strategies to achieve maximum success in reproductive output. Nesting is one such aspect where one or both the parents find a safe and suitable place where the eggs can be protected or young can be reared to a stage until it can live on its own.

The breeding season starts with the selection of a suitable breeding partner, then the selection of a site where it can lay the eggs or give birth to young ones – with required

addition and modification of the site. This site, broadly referred to as the '**nesting site**' in this work, is very crucial to the survival of the young ones, and hence, the species itself.

The variations in nests and nesting habits of a representative 88 species of birds out of 473 species found in Orissa have been described in this work. Similarly, the nesting habits of representative reptiles among lizards, snakes, crocodilians, land tortoises, freshwater turtles and marine turtles have also been described. Squirrels which make prominent nests have been added to the pages along with a note on the shelters prepared by Wild boar for its young.

The wildlife organization, striving to conserve biodiversity in its entirety, is trying to bring before the people the various locations, and the various designs, in which nature is at its best in procreation.

A Peafowl and a Jungle Fowl, both with limited ability to fly, scoop out a shallow depression on the forest floor and lay the eggs. Predators may miss the eggs because of camouflage but eggs are not spared by fire set by people and trampling by cattle.

The ducks and geese use reeds and floating vegetations to lay their eggs and incubate these *in situ*. Untimely death of the parent bird due to poisoning, netting or shooting leave the eggs unattended and unhatched.

Saving the nesting habitat of parakeets, woodpeckers, owls, hill mynas and even the Pied Hornbill would mean allowing trees to remain standing with holes and hollows.

There is a reason to every denial the Wildlife Organisation makes to requests seeking removal of "dead trees" or "collection of random rubbles" or collection of firewood. In a Sanctuary every corner is a nursery site, a site of procreation teeming with life. Basically, that is the reason for so much of restrictions imposed in entry into sanctuary or in using the resources available within a sanctuary.

People love and care young ones of all species. It is necessary to leave the egg and young ones in their own place. It is necessary to know the places where nature grows the young ones. Through the present compilation it is a sober attempt to familiarize the readers to the variety of nests and the variety of habitats in which these are constructed by different species of mammals, reptiles and birds.

With this familiarization it is expected that people will respect the provisions of the Wildlife Protection Act, and avoid collection of nests, eggs or young which, in the absence of an attending mother, may appear to be abandoned.

Errors and deficiencies noticed and suggestions may kindly be brought to our notice for necessary additions and rectifications in future editions.

HAIRY MATRONS (The Nesting Mammals)

The Indian Giant squirrel, *Ratufa indica* (Oriya: Belerá Musá, Nepáli Musá)

While driving through the forest, it is common to come across chipped off pieces of Asan (*Terminalia tomentosa*) fruits on the road. Most often these are due to Giant Squirrels feeding atop. They live in forests with continuous canopy cover and, therefore, indicate the health of the forest at the higher stratum. In Similipal, the Asan tree constitutes one of the twenty one species of food plants of *Ratufa*. Normally, the bud, flower, fruit, leaf and petioles are the favoured parts consumed by this species.

Largest among the forest squirrels in South Asia, the Giant Squirrels are more often heard than seen. They are most active in the early hours of the morning and in the afternoons. While walking through the forest on a sunny morning, if we notice shaking shadows on the ground of leaves on tree top, it is most often due to langurs or a Giant Squirrel leaping from tree to tree with amazing skill and accuracy.

Our Giant Squirrels use at least thirteen different plant species for building their nests. Most of the nests are on Champa, Sal, Kusuma, Asana, and Rimili. Other nesting trees are Amba, Baranga, Chadheigudi, Dhaura, Jamun, Jyesttha madhu, Sidha and Simili.

The nest is globular, made of twigs and leaves, located on branches away from reach of monkeys. Nests are often at nearly 30m height. The nest opening is almost horizontal to the ground, and is about 35cm deep with 40 cm diameter. From outside, the nest may cover a span of 120cm x 50cm. Inside of the nest is smooth where leaves remain arranged in 3-4 layers between twigs providing a circular frame. Parents keep the nest chamber clean of excreta and food. A single squirrel may use more than 4 nests within a territory as a strategy either to escape from predator or for shelter during natural calamities.



Young *Ratufa* in nest



Indian Giant Squirrel *Ratufa indica*

As with most other animals, midday is a time for Ratufa to rest. The animal takes its siesta in its nest, especially if the weather is cold or wet. At other times it rests spread-eagled on a branch, with its long tail drooping over the side.

In Similipal Tiger Reserve the population of giant squirrel is estimated to be a few thousands. Giant Squirrels are seen nesting in the forests of Satkoshia Gorge Sanctuary, Kapilash in Dhenkanal district, and Sal forests of Sambalpur, Kalahandi, Phulbani, Ganjam and Koraput districts. A picturesque place to see these animals in some number is Kaliamba in Ghumsur North Forest Division. Young squirrels robbed from their nests make fancy subjects in clandestine pet trade. It is illegal.

[Scientific names of plants mentioned in local Oriya language: Champa (*Michelia champaca*), Sal (*Shorea robusta*), Kusuma (*Schleichera trijuga*), Asana (*Terminalia tomentosa*) and Rimili (*Bursera serrata*), Amba (*Mangifera indica*), Giringa (*Stereospermum heyneanum*), Chadheigudi (*Vitis peduncularis*), Dhaura (*Anogeissus latifolia*), Jamun (*Syzygium cumini*), Jyestha madhu (*Sideroxylon tomentosum*), Sidha (*Lagerstroemia parviflora*) and Simili (*Bombax ceiba*).]

Common Giant Flying squirrel, *Petaurista petaurista* (Oriya: Udanta Musa)

The Flying Squirrels are forest animals that roost in the hole in a tree or a sheltered place among the branches during the day. They emerge from the shelter at dusk, become active in the night and retire before dawn.

The roosting hollow is lined with soft leaves, moss, fur, etc. and used as a nest by breeding pairs. When the young are born the nest hole is occupied solely by the mother and her offspring. Flying Squirrels may also build large leafy nests similar to those seen for other squirrels.

They feed on fruits, nuts, barks of trees, resin exudates from tree trunks, insects, larvae, etc. Flying squirrels are seen in the hilly tracts of Similipal, Satkoshia Gorge Sanctuary, Malyagiri, and the districts of Sundargarh, Dhenkanal, Sambalpur and Kalahandi.



Three striped palm squirrel, *Funambulus palmarum* (Oriya: Gunduchi Musa)

Palm Squirrels are common throughout the state. Their nest looks like a clump of leaves built on the branches of trees. Squirrel mother constructs a second nest in the vicinity where she can move her small babies during emergency. At times the entire squirrel family may move for some unexplained reasons.

Five striped Palm Squirrel, *Funambulus pennanti* (Oriya: Gunduchi Musa)

The Five striped Squirrel is the commonest and most familiar of all Indian squirrels. The male and female

Squirrel-watching can be a good pastime

come together for only a day or two. The period of gestation is about six weeks. The female builds a untidy nest of grasses, leaves and fibre, when she is about to bring forth her young. The nest is placed in a tree, or in the rafters of a house, or in holes in the walls. Two or three young are produced. They are born blind and remain in the nest till they are able to fend for themselves.

They feed on fruits, nuts, young shoots, buds and bark. They also eat the pods and even insects and eggs of birds are eaten at the pinch period. They are persistent egg robbers. The squirrel has become almost as dependent on man for food and shelter as house rats and mice.

Indian Wild Boar, *Sus scrofa* (Oriya:Barha) The wild boar constitutes a main component in the prey-regime for large carnivores like tiger and leopard in the nature. Wild boars are seen all over the state in different forest types and also coastal mangrove swamps.

Wild boar are prolific breeders and breed in all seasons. The majority of young are born either shortly before or shortly after the rains. The period of gestation is about four months, and four to six young are born at a time. The mother shelters the young ones in a heaped-up mass of grass or branches which she builds before she litters. The piglets of wild boar have longitudinal stripes on body.

In Bhitarkanika Wildlife Sanctuary the wild boars are seen sheltering the young ones in a pile of leaves and twigs of mangrove plants often with leaves of *Acrostichum aureum*, an aquatic fern locally known as 'Kharkari'. The nest of wild boar may appear like a half-constructed nest of estuarine crocodile because of similar nesting material used by both the species.

Wild boar are generally poached for meat, and the young ones are stolen by the people for domestication. Wild boar displays great intelligence and few animals show greater courage and determination. The sense of smell is acute. The eye sight and hearing are moderate. They are omnivorous, living on crops, roots, tubers, insects, snakes, offal, and carrion.



Mother-Wildboar with piglets



Wild Boar emerging from a grassland

FEATHERY WARMTH (Nesting by birds)

Birds, the feathered creatures, offer warmth and protection to eggs and fledglings in a variety of nests, for which the nests are engineered by parents with care and concern.

Nesting materials are selectively chosen and arranged or woven at a secure place. Nests take a shape, often characteristic to a particular group of birds or a particular species. The aim is to safely deposit the eggs incubate these and take care of the fledglings till they fly out of the nest to start on their own.

Some birds use twigs to build their nest, common among which are the Cormorants, Darter, Egrets, Painted Stork, Open-billed stork, White Ibis, Pond Heron, Kites, Eagles, Pigeon, Doves, Crow, Drongo, Treepie, etc.

Birds which make **nests in tree holes or holes drilled in earthen banks** are the Lesser Whistling Teal or Tree Duck, Indian roller or Blue Jay, Common Hoopoe, Collared Kingfisher, Rose-ringed Parakeet, Common Hill myna, and Common Myna or Indian Myna.

Basically, the hole-nesters can be divided into two categories. Species like the Barbets, Woodpeckers, Kingfishers, Bee-eaters, etc. are the primary hole nesters as they excavate their own nest holes. The Secondary Hole Nesters are species which make use of existing tree-holes or those drilled by the primary hole-nesters. They include the Mynas, Rollers, Parakeets, and the Hornbills.

Birds which make **nests on floating weeds or semi-aquatic weeds** include the Common coot, Purple Moorhen, Water Cock, White-breasted Waterhen, Blue-breasted or Slaty-breasted Rail, Pheasant-tailed Jacana and Bronze-winged Jacana, etc.

Birds which make **cup-shaped nests made up of grass, fibres etc.** are Golden Oriole, White-browed Fantail Flycatcher, White-throated Fantail Flycatcher, Asian Paradise-Flycatcher, Common Iora and Scarlet Minivet, etc.

Birds which make **simple scrapes on the ground** for nesting include the Indian Peafowl, Red Jungle Fowl, Grey Francolin or Partridge, Painted Bush Quail, Yellow-wattled Lapwing, Red-wattled Lapwing and Common Indian Nightjar, etc.

Birds which make **mud nests** include the Dusky Crag Martin, Red-rumped Swallow and Malabar Whistling Thrush, etc.

Birds which make **woven oblong or purse type nest** include the Ashy Prinia, Indian Baya, Black headed Munia and Purple Sunbird, etc.

TWIG NESTS

Little Cormorant, *Phalacrocorax niger* (Oriya: Panikua) are commonly seen singly, or in groups near marshy areas, tanks, small and large water bodies, paddy fields, etc. and mainly feed on fishes preferably small cat fishes. Males and females are similar in appearance.

Nesting takes place between July to September. They build the nest on a shallow platform of twigs with a cup like depression on trees usually in mixed colonies of Egrets, Herons, Open-billed storks, etc. The nest can be both near and away from water source. Usually 4 to 5 eggs are laid. Eggs are pale bluish green in colour with a chalky surface. Little cormorants are often trapped in fishing nets and are killed.

Darter or Snake Bird, *Anhinga melanogaster* (Oriya: Khaparkhai) are usually seen singly, or in small groups near tanks, reservoirs, tidal rivers and creeks and mostly feed on fishes.

Nesting season of the species is between June and August. It builds the nest on a twig platform with a cup like depression similar to the cormorant's on the trees amongst a mixed heronry near water sources. Usually 3 to 4 eggs are laid. Eggs are elongated and pale greenish in colour. Nestlings are very noisy while being fed by the mother.

Painted Stork, *Mycteria leucocephala* (Oriya: Saranga or Chitrita kauncha) are restricted to a few marshy areas/ wetlands such as Bhitarkanika and Mahanadi delta of Kendrapara District, Bargarh district, etc. and mostly feed on fishes. Occasionally they are also known to consume small reptiles, frogs, crustaceans and insects.



Darter



Little Cormorant

There is no sexual dimorphism in this species. Nesting takes place between August and January. Nest looks like a large stick platform with a shallow depression in the middle lined with leaves, straw, etc. Nests are built on trees standing near the bank of tidal rivers or any other water source. Often 10 to 20 nests are found in a single tree close to each other. The birds breed in large heronries, often sharing these with other water birds like cormorants, egrets, herons, bitterns, open billed storks, white ibises, etc. In Bhitarkanika, they prefer to build the nests among river banks on tall trees such as *Sonneretia* species, and in Bagapatia gherry in the National Park area. Usually 3 to 5 eggs are laid. Eggs are dull white. Both parents share all the domestic duties during the incubation period and take care of the young ones. Painted storks are killed for meat and for plumage.

Flocks of **Asian Openbill**, *Anastomus oscitans* (Oriya: Gendalia) are usually seen in water bodies and marshes as well as tidal rivers, creeks, mudflats, well-watered paddy fields, etc. Males and females are similar in appearance. They mostly feed on mollusks. Occasionally they are also known to consume crabs, frogs, etc.

This is a local migratory bird. It is one of the commonest storks and widely distributed. Open billed storks prefer to stay together while feeding, roosting and during nesting.

These birds breed in colonies amongst mixed heronries of cormorants, egrets, herons, painted storks, etc. Nesting takes place between July and October. Nest placed high on



Openbill storks at nest



Openbill stork nesting colony



Painted stork with chick



Painted stork nesting colony

trees, and looks like a circular platform of twigs with the central depression lined with leaves of varieties of trees. In Bhitarkanika there is a huge heronry, named Bagagahan near Suajora creek of Bhitarkanika National Park where 11 species of water birds congregate for colonial nesting. Nests are built on tall trees such as *Excoecaria*, *Heritiera*, etc. Over 15,000 birds nests in this heronry among which Openbill population is over 80%. Such heronries are also found in Nandankanan Zoological Park and Karlajori village in Bhatli block of Bargarh district. Usually 2 to 4 eggs are laid. Eggs are white in colour. Adults and young are killed for meat.

Small flocks of **Oriental White Ibis, *Threskiornis melanocephalus* (Oriya: Dabentia or Dhala Bajeni)** are seen on marshy lands. In breeding plumage, slaty grey colour appears on scapulars and in wings, and ornamental plumes at base of neck. Males and females look similar. In the breeding season they make remarkably loud booming call.



Oriental white Ibis

Nests are continuously repaired covering the entire length of the incubation period and till the fledglings are capable of flying. During the above period the parents returning to the respective nests holding fresh twigs of various mangrove trees in their bills is a common sight. Nesting takes place between June and September. Nest looks like a platform of twigs on trees standing in or near water source. They are also frequently seen on village outskirts, and usually amongst mixed heronries. Usually 2 to 4 eggs are laid. Eggs are bluish or greenish white, sometimes with yellowish brown spots. It feeds on fish, frogs, molluscs, insects, worms, etc. but at times vegetable matter is also taken. This bird is local migrant and commonly seen in marshy areas and water bodies. This bird is killed for its meat.

Lesser Adjutant Stork, *Leptoptilos javanicus* (Oriya: Hadagila) are solitary birds. Both males and females are similar in appearance. Nesting takes place between November to January. Nest looks like massive platform of sticks in big trees such as Sundari, Kurum, etc.

Usually 2 to 4 eggs are laid. Eggs are bluish or greenish white, sometimes with yellowish brown spots. Chicks are fed on with fish, frogs, reptiles and invertebrates.

This bird has limited distributional range and presently seen in well protected marshy areas/wetlands such as Chilika lake, Bhitarkanika, Hirakud Reservoir areas etc. Lesser Adjutant storks are residents in Bhitarkanika mangrove area, where a small population is seen. Main threats to this species are shrinkage of wetland habitats, use of pesticides in paddy fields, loss of tall nesting trees, disturbance to nesting sites, etc.

Little Egret, *Egretta garzetta* (Oriya: Rani Baga) is a very common water bird. Flocks are seen in marshlands, rivers, small and large water bodies, tidal mudflats, etc. Little egrets are gregarious in nature. A long drooping crest of two narrow plumes is acquired in the breeding season. Both males and females are similar in appearance.

Nesting takes place between July/August. Nests are in the form of shallow twig platforms lined with straw, leaves, etc. built on trees, amongst mixed heronries, often near villages. Usually up to 4 eggs are laid. Eggs are pale bluish - green in colour. Chicks are fed with insects and fish; adults feed on frogs, small reptiles, etc. Little egrets are trapped and killed for meat as well as for its plumage.

Cattle Egret, *Bubulcus ibis* (Oriya: Gaya Baga or Nandi Baga) are widely distributed throughout the state. They are gregarious in nature. There is no sexual dimorphism. Small groups are usually seen with grazing or resting cattle.

Nesting season of the species is between June to August which varies according to local monsoon conditions. Nest is an untidy twig platform on trees of varying sizes. Nests are made in mixed colonies with cormorants, egrets, etc. in large leafy trees. Nests are made not necessarily near water and often nests are seen in the midst of a noisy town. Normally the birds are very silent but they make a low croak especially at the nest colony. Usually 3 to 5 eggs are laid. Eggs are pale milk blue in colour. These birds are trapped and killed for meat and for plumage.

It is often difficult to distinguish **Median Egrets, *Mesophoryx intermedia* (Oriya: Majhia Baga)** from the slightly bigger **Large Egret** except in breeding plumage, when filamentous plumes occur on back as well as on breast. These birds are frequently seen near small water bodies, marshes, estuaries, mangrove swamps, etc. They are also often seen in small flocks in the non-breeding season. They feed on fish, frogs, etc.

Median egrets are colonial nesters and prefer to nest along with other water birds such as Herons, Cormorants, Open billed storks, Egrets etc. Nesting takes place between



Lesser Adjutant stork at nest



Little Egret at nest

June to September depending on locality. Nest look like a platform of sticks on trees in or near water or trees away from water even in the midst of noisy city streets. Usually 3 to 4 eggs are laid. Eggs are pale green. Both sexes share domestic duties. These birds are trapped and killed for meat by local tribals.

Large Egret, *Casmerodius albus* (Oriya: Bada Baga) are solitary birds found near water bodies, marshes, rivers, etc. They feed on fish, frogs, etc. These are widely distributed throughout the state. During breeding season these birds develop a cluster of ornamental dorsal plumes falling over beyond the tail. These birds are difficult to distinguish from other egrets in non-breeding plumage – diagnostic pointers are the very long neck with typical s-shaped kink, and the gape-line extending behind the eye. Nesting takes place between July to September. Nest look like a flimsy platform of sticks on trees in or near water or trees away from water even in the midst of noisy city streets. Usually 3 to 4 eggs are laid. Eggs are pale green. Both sexes share rearing of young. These birds are trapped and killed for meat and plumage by local tribals.

Purple Heron, *Ardea purpurea* (Oriya: Anjana) are seen mainly in a few wetlands such as Chilika, Bhitarkanika, Hirakud, etc. Nesting takes place between June to March. They nest usually in exclusive colonies of their own; if in a heronry, segregated to its own species. Nest looks like platform of sticks, etc., in trees as well as reed beds. Usually 3 to 4 eggs are laid. Eggs are pale green or greenish blue. Both sexes share parental duties.

The birds are largely solitary and seen at water bodies, swamps, etc. They usually prefer to remain in dense cover, flies up with a harsh croak when startled. They feed on fish, frogs, snakes, etc. Their population is threatened due to shrinkage of wetland habitats, massive use of pesticides, loss of tall nesting trees, etc.

In breeding season **Indian Pond Heron, *Ardeola grayii* (Oriya: Kantia Baga)** acquire hair-like plumes on back, and long white occipital crest. Adults of both sexes look alike.



Median Egret



Cattle Egret at its nest

Pond herons are found wherever there is water; river, Jheel, roadside ditch, or temple pond, often even in the midst of populous towns. These are also found on the seacoast near mangrove swamps, tidal mudflats, etc.

Nesting takes place between May to September. Nest looks like an untidy twig platform on large mango, tamarind and other tall trees including mangrove plants, shared with other egrets. Nests are also made within town limits; not necessarily near water. Usually 3 to 5 eggs are laid. Eggs are pale greenish blue in colour. These birds feed on frogs, fish, crabs and insects.

Pallas's or Ring-tailed Fishing Eagle *Haliaeetus leucoryphus* is a large striking bird of prey with a pale golden brown head with a broad white band across tail, conspicuous in flight. Sexes are alike, with the female larger in size. Found along large lakes and rivers; in our state, is seen at Chilika and Bhitarkanika.

Nesting season is from November to March, the nest being a massive stick platform at the top of a large tree near water, used year after year. 3 white, broad oval eggs are laid. Both sexes share all the domestic duties.

Brahminy Kite, *Haliastur indus* (Oriya: Sankha Chila) is a prominent raptor of our wetland areas. These are resident and locally migratory birds and are mainly seen near marshy areas, river, lagoon or seacoast and other water bodies.



Large Egret



Median Egret Chick



Purple Heron



Brahminy Kite



Pallas's Fishing Eagle

Nesting takes place between December to April. Nest look like a loose platform of twigs, lined with green leaves, etc., built up in a large peepal, banyan or similar tree growing near water. In Bhitarkanika they make nests on mangrove trees (Sundari, Kurum, Banian, etc.) near tidal creeks and rivers and also, they are seen nesting in peripheral areas of Chilika, Hirakud Reservoir, etc.

Usually 2 eggs are laid. Eggs are greyish white, speckled and blotched with reddish brown. Both sexes share the rearing of young ones. They move inland during monsoon for land crabs and frogs in waterlogged areas. They feed on fish, frogs, small snakes, bats, etc. The population of Brahminy kites is dwindling due to shrinkage of wetland habitats, increasing urbanization, deforestation, pollution of water, poisoning of food through use of pesticides, and scarcity of preferred food material.

Pariah Kite or Black Kite, *Milvus migrans* (Oriya: Matia Chila) are seen throughout the state and is the commonest raptor in our state. They are seen singly or gregariously, scavenging in towns and villages.

There is no sexual dimorphism. Nests are built of twigs, leaves, rags and rubbish in a large tree or on roof of a building. Usually 2 or 4 eggs are laid. Eggs are dirty pinkish white. Food consists of offal and garbage, earthworms, winged termites, lizards, mice, disabled or young bird, and almost anything else that can be procured. Increasing

urbanization, poisoning of food through use of pesticides, disappearance of large trees where they perch and nest are posing threat to their survival.

White-bellied Sea Eagle, *Haliaeetus leucogaster* (Oriya: Urubala) is a large and handsome eagle. There is no sexual dimorphism. They are seen singly or in pairs on the sea coast and mangrove wetlands.

Nesting takes place between October to June. Nest look like a huge platform of sticks lined with green leaves placed high up in a casuarina or some other lofty tree near the seashore. In Bhitarkanika mangroves, these eagles usually nest on tall mangrove trees (Keruan, Sundari, etc.) near the tidal creeks and rivers. In the peripheral areas of the Chilika Lagoon, they are also seen nesting on tall trees. Usually the same nest is renovated year after year and a clutch of two eggs are laid. The population of this remarkable bird is dwindling due to increasing urbanization, shrinkage of wetland habitats, deforestation, pollution of water, poisoning of food through use of pesticides, disappearance of large trees where they perch and nest as well as scarcity of food viz. large fishes.

Indian White-backed Vulture, *Gyps bengalensis* (Oriya: Saguna or Rabana Chadhei) which was once very common throughout the state is now restricted to only few areas / locations. Both males and females look alike.

These birds are carrion-feeders and useful scavengers on the countryside and in the environs of towns and villages.



White Backed Vulture at nest



White bellied Sea Eagle



Pariah kite pair at nest

Nesting takes place between October to March. Nest looks like a large untidy platform of sticks on the top of a banyan, tamarind or other tall tree often along the roadsides or near villages or in protected areas. In Bhitarkanika mangrove areas vultures usually prefer tall "Keruan" trees close to creek / river banks for building nests. One or two eggs are laid. Eggs are white and spotted with reddish brown. Shrinkage of wetland habitats, increasing urbanization, deforestation, disappearance of large trees where they perch and nest, pollution of water, poisoning of food through use of pesticides, as well as scarcity of food are posing threats to their population. It is at present a highly threatened bird species. The biggest threat has been the drug Diclofenac which is used for treating livestock. It has proved fatal to vultures who normally feed on these carcasses.

Colonies of **Blue Rock Pigeon, *Columba livia* (Oriya: Para)** flock around cliffs and human habitations. Interbreeding with fancy domestic strains has changed wild genetic profile. They may be local migrants.

Both males and females are similar in appearance. They nest round the year. The semi-feral birds nest practically throughout the year. The nest looks like a flimsy collection of a few sticks on a ledge or in a fissure of cliff, or on rafters and ceilings of dwelling houses, deserted or occupied. Usually 2 eggs are laid. Eggs are white in colour, elliptical in shape. Both sexes share all the domestic duties. Food consists of mainly cereals, pulses, etc.

Spotted Doves, *Streptopelia chinensis* (Oriya: Kapota) inhabit open well-wooded and cultivated lands. They freely enter the gardens and verandas of bungalows.

Both males and females look similar. The birds nest throughout the year. Nests are laid on The nests are made up of sticks and placed on trees, on cornices, beams and also under caves. Usually 2 eggs are laid. Eggs are white in colour, elliptical in shape. Both sexes share in all the domestic duties. Food consists of mainly grains of paddy, maize, other cereals, grass and weed seeds. Their population is under threat due to collection of eggs from nests for human consumption.

House Crow, *Corvus splendens* (Oriya: Kaau) is very common and widely distributed species. These birds are found chiefly in plains, but also in many hilly areas. They live in close association with man and obtain its livelihood from the discarded foods.

There is no sexual dimorphism. Nesting takes place between April to June, nest is made on a platform of twigs intermixed with plastics, iron wire, with a cup-like depression lined with coir fibers, etc., 3 m or more up in a tree; sometimes several nests are made in the same tree. Usually 4 to 5 eggs are laid. Eggs are pale blue green, speckled and streaked with brown. Both sexes share incubation and nest-feeding. Often community of crows roosts in selected trees or groves where large numbers collect every night. The bird is a useful scavenger and a serious menace to defenceless in urban areas. They have no particular food preferences. The Koel *Eudynamis scolopacea* is a brood parasite of House Crow as well as the Jungle crow.

Jungle Crow, *Corvus macrorhynchos* (Oriya: Damara Kaau) a glossy jet black crow with a heavy bill. These birds are seen singly, in pairs or in small groups.

Although it is chiefly a bird of the countryside, small numbers are also found in towns and villages. These are closely associated with vultures feeding on carrion. Its movements often lead to discovery of kills of Tiger, Panther or other wild animals hidden in the jungle which the bird quickly locates.

There is no sexual dimorphism. Nesting takes place between March to May. Nest and eggs resembles the House Crow's; the latter slightly larger. Both sexes share parental duties. It is omnivorous, and highly destructive to eggs and chicks of other birds including domestic poultry, and also to young of small mammals.

Indian Treepie, *Dendrocitta vagabunda* (Oriya: Karkara or Tarupik) is a long-tailed chestnut-brown bird with sooty head and neck. The Black-tipped grey tail and grayish white wing patches are conspicuous in flight. The species frequents wooded country and scrub jungles. They also freely enter residential compounds and gardens.

Usually noisy pairs or small groups are seen. There is no sexual dimorphism. Nesting takes place between February to July. Nest are comparatively deeper and made up of thorny twigs, lined with rootlets. Nests are often concealed in foliage of moderate sized trees. Usually 4 to 5 eggs are laid. Eggs are variable in shape and colour; most commonly pale salmon-white splashed and streaked with bright reddish brown. Both sexes share parental duties. The birds are omnivorous like the crows. The food consists of fruits, insects, lizards, frogs, centipedes and even carrion, in addition to the eggs and helpless young of other small birds and rodents.

NESTS IN TREE HOLES

Lesser Whistling-Duck, *Dendrocygna javanica* (Oriya: Hansarali) are local migratory and resident water birds. Small flocks are usually found on vegetation covered tanks, ponds, small water bodies, small and large water bodies, etc. They perch and roost freely on trees.

Nesting takes place between June to October. Nests are built in natural tree hollows lined with twigs and grasses. Sometimes nests are also built on the ground among reeds. Usually 7 to 12 eggs are laid. Eggs are ivory white. Both sexes incubate and lead the young ones upon hatching. These birds are seen nesting regularly in well-protected wetland habitats such as Bhitarkanika, Chilika, Hirakud, Kanjia lake of Nandankanan, etc. Lesser whistling teals are largely vegetarian, feeding on shoots and grains but they also eat small fish, snails, etc. Increasing urbanization, shrinkage of wetland habitats, loss of nesting trees, etc. are the major threats to their population. They are also killed for their meat by the local people.

Little Grebe, *Tachybaptus ruficollis* (Oriya: Dubdubi) is a tailless little water bird with silky white under parts and short pointed bill. In breeding season the plumage of head and neck is dark brown. Both male and female are similar in size and colour. They are seen in pairs or parties in wheels, village tanks, small and big reservoirs, etc. These birds are local migratory but resident to the marshy areas of Chilika lagoon, where they breed and nest. They feed on aquatic insects, tadpoles, crustaceans etc.

The breeding season is between April to October. The nest is built by the available vegetation or weeds on floating vegetation. Two to three eggs are laid, they are white in colour but gradually changes to brownish due to contact with rotten vegetation.

Indian Roller or Blue Jay, *Coracias benghalensis* (Oriya: Bhadabhadalia) are resident and partial local migrants.

They make spectacular courtship display, somersaulting and nose-diving in the air to the accompaniment of harsh, grating screams. Nesting takes place between March to July. Nest appears like a collection of straw, rags and rubbish in a natural tree-hollow at moderate heights; sometimes in a hole in the wall of a building. Usually 4 to 5 eggs are laid. Eggs are glossy white. Indian rollers are highly beneficial to agriculture since they destroy vast quantities of injurious insects. Food consists largely of insects (beetles, locusts, crickets, etc.) taken in the air. They also feed on frogs, lizards and occasionally small snakes and field mice, and rarely young birds. The population of Blue Jay is under threat due to intentional capture for the flourishing pet trade.

Common Hoopoe, *Upupa epops* (Oriya: Satira Chadhei or Saraguna) is a fawn coloured bird with zebra markings on back, wings and tail and a conspicuous fan-shaped crest, with long, slender, gently curved bill. The birds are seen singly or in pairs, usually on the ground in lightly-wooded country.



Hoopoe with food for its nestlings



Indian Roller feeding its young

Hoopoes are resident and also locally migratory. The birds inhabit open country, plains and hills up to about 2000 feet in elevation. These are fond of lawns, gardens and groves in and around villages and towns.

Nesting takes place between February to May. Nests are made in natural tree-hollows or holes in wall or ceilings of buildings, untidily lined with straw, rags and rubbish. Usually 5 to 6 eggs are laid. Eggs are white in colour. The nest is notorious for its filthiness and stench. Both parents share in feeding the young ones.

Collared Kingfisher, *Todiramphus chloris* (Oriya: Machharanka Chadhei) are found in coastal areas of Orissa and are commonly seen near mangrove swamps including Bhitarkanika and coastal cultivations.

They make a harsh, unmusical "krek, krek, krek" call very vocal in the morning and in the breeding season. Nesting takes place between April and May. Nests are made in the hole of tree trunks. Usually 3 to 4 eggs are laid. Eggs are white in colour and oval in shape. Both sexes share parental duties. Food consists of crabs, mud skippers, fishes and insects. Tree felling and canopy loss is a threat to the species.

Female **Rose-ringed Parakeet, *Psittacula krameri* (Oriya: Sua)** lacks the black and rose-pink collar of the male. Noisy flocks are seen near cultivation, in lightly-wooded country. Practically the birds are seen in the entire state from plains and locally up to 2000 m in the hills.

Nesting takes place between February to April, varying locally. Nest is made in natural hollow in tree-trunks, or excavated by the birds themselves or holes in rock scarps and walls of buildings, ruined or in occupation, often within noisy towns. Usually 4 to 6 eggs are laid. Eggs are pure white in colour, oval in shape. Both sexes share all domestic duties. Food consists of mostly fruits, grains, buds, seeds etc. both wild and cultivated. Threats to the species include collection of eggs, chicks and adults for the flourishing pet trade.

Common Hill Myna, *Gracula religiosa* (Oriya: Sari) are seen in pairs or noisy flocks in hill forests of Similipal, Kuldiha, etc. Pairs or noisy flocks are found in well-wooded country feeding on the various wild figs in company with green pigeons, hornbills and other fruit-eating birds. These birds are accomplished mimics of human beings, thus considered as a talking bird, and much prized as a cage bird.



Hill Myna

There is no sexual dimorphism. Nesting takes place between March to October. Nest appears as a collection of grass, leaves, feathers, etc., stuffed into natural hollows in tree-trunks in forest, usually 10 to 25 m up. Usually 2 eggs are laid. Eggs are deep blue sparsely spotted and blotched with reddish brown. Food consists of mostly fruits. Indiscriminate collection of eggs, chicks and adults by local tribals for the flourishing pet trade are posing a threat to the species.

Common Myna or Indian Myna, *Acridotheres tristis* (Oriya: Bani Chadhei) are seen in pairs or in small groups close to human habitations and widely distributed throughout the state. It is a confirmed associate of man. The birds are found wherever a new habitation comes up.

Both males and females are similar. Nesting takes place between April to August. Nest is made on a collection of twigs, roots, paper and rubbish in a hole in a tree, wall or ceiling. Usually 4 to 5 eggs are laid. Eggs are glossy blue. Two broods often raised in succession. Both sexes share domestic duties. The birds are omnivorous. They eat fruits, insects, kitchen scraps and also follows the plough for earthworms, etc.

EARTH BANK TUNNEL NESTS

Females of **Lesser Pied kingfisher, *Ceryle rudis* (Oriya: Kilikila or Machharanka Chadhei)** are similar to males but with a single black gorget broken in the middle, as against two more or less complete ones in the male. They are seen singly or pairs, near streams and tanks, perched on rocks or hovering above water. They are distributed throughout the plains of the state.

The birds frequent rivers, water bodies, irrigation tanks and tidal creeks. Nesting season is between October and May. Nests are made in a horizontal tunnel dug in a precipitous mud-bank of a stream. Usually 3 to 4 eggs are laid. Eggs are glossy white, roundish ovals. Both sexes share excavation, incubation and feeding the young ones. Food consists of fish, tadpoles, frogs as well as aquatic insects. Threats to the nest include inundation by tidal waters during exceptionally high tides. This is a threat which also affects all the nesting kingfishers.

Small Blue Kingfisher, *Alcedo atthis* (Oriya: Rangei Dubi) are found in coastal areas of Orissa and are commonly seen near mangrove swamps including Bhitarkanika and coastal cultivations. There is no sexual dimorphism. Nesting season is between March to June. Nest is made in a horizontal tunnel dug into the earth-bank of a stream or ditch, 50 cm to a metre in length, ending in a widened egg chamber. Usually 5 to 7 eggs are laid. Eggs pure white, glossy in colour, oval in shape. Both sexes share all the domestic duties. Food consists of small fish, tadpoles and aquatic insects.

Black-capped kingfisher, *Halcyon pileata* (Oriya: Kala Topia Machharanka Chadei) are found in coastal areas of Orissa and are commonly seen near mangrove swamps

including Bhitarkanika and coastal cultivations. Nesting takes place between May to July. Nest is made in a tunnel excavated in the earth-bank of a river or creek ending in a widened egg chamber. Usually 4 to 5 eggs are laid. Eggs are pure, white and spherical. It is largely dependent on the presence of water, chiefly salt or brackish, for its food such as fish, crabs, etc. It mainly feeds on fish, crabs, etc.

White breasted or White-throated Kingfisher, *Halcyon smyrnensis* (Oriya: Machharanka Chadhei) is the most familiar of our kingfishers and the species is the least dependent upon water. They are seen near ponds, rain-filled ditches, inundated paddy fields and near the seashore, but also in light forest at considerable distances from water.

These are seen singly in cultivated and wooded country, both near and away from water. The birds are seen in plains and lower hills throughout the state. There is no sexual dimorphism. Nesting takes place between March to July. Nest appears to be typical of the kingfishers; in a horizontal tunnel dug into the side of a dry nullah or earth-cutting. Usually 4 to 7 eggs are laid. Eggs are white, spherical. Both sexes excavate, incubate and feed the young. Food consists of fish, tadpoles, lizard, grasshoppers and other insects. Occasionally young birds and mice are also consumed.

Stork billed Kingfisher, *Halcyon capensis* (Oriya: Machharanka Chadei) are easily distinguished from all other brightly coloured kingfishers by their large size and enormous, compressed blood-red bill. Head brown, upper parts pale greenish blue, under parts pale yellowish brown.

They are seen singly, or separated pairs, at forest streams, near well-watered and swampy areas. It is commonly seen on telegraph wires along the railway tracts. These are also seen in mangroves along tidal creeks.

Nesting takes place between January to July. Nest appears to be typical of the kingfishers; the typical horizontal tunnel of kingfishers, excavated in a steep out scoured bank of a forest stream or river. Usually 4 to 5 eggs are laid. Eggs are white, glossy in colour, oval in shape. Sexes alike. Food consists of fish, crabs, reptiles, frogs, and occasionally also young birds and eggs from nests of other birds.

Green Bee eater, *Merops orientalis* (Oriya: Kita Khia Chadhei) are distributed throughout the state. These are resident and locally migratory. These birds are seen in pairs, or in small groups, in open country on telegraph wires, fence-posts, etc. There is no sexual dimorphism. Nesting season is between February to May. Nest is made in a horizontal or oblique tunnel ending in a widened egg chamber, dug in the side of an earth-cutting, burrow-pit or in uneven sandy ground. Usually 4 to 7 eggs are laid. Eggs are pure white in colour, oval in shape. Both sexes share in excavating nest tunnel and feeding young ones. Food consists of insects, chiefly flies, bees and wasps.

Flocks of **Jungle Myna, *Acridotheres fuscus* (Oriya: Patha Bani)** are seen in open country and around human habitations. These birds are similar to the Common Myna, but the bright yellow skin is absent. It feeds on municipal refuse dumps for scraps and titbits and attends on grazing cattle for insects.

Nesting takes place between May to August. Nest is built in a pad of grass and rubbish stuffed in weep holes of revetments of bridges or in self-excavated tunnels in earth-cuttings. The species often nest in colonies. Usually 3 to 5 eggs are laid. Eggs are glossy pale blue in colour.

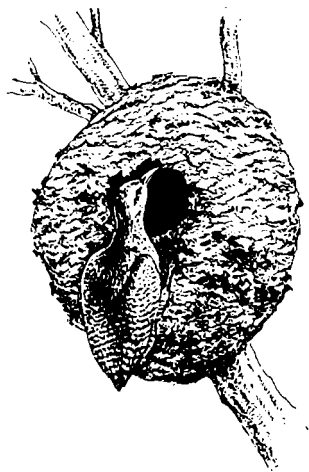
Common Golden-backed Woodpecker, *Dinopium javanense* (Oriya: Suna pithia Katha hana chadhei) inhabit foothill of moist-deciduous and evergreen forests. These are seen in pairs, often in the company of mixed hunting parties. These birds are distinguished from the very similar Lesser Golden-backed Woodpecker by the crimson rump and orange or scarlet mixture on upper back. The black nape distinguishes it from the Whitenaped Large Goldenbacked woodpecker.

Crown and crest crimson coloured in males; where as it is black stippled with white in females. Nesting takes place between January to May. Nest is made in a tree hole usually at a height between 2 to 10 m. Usually 2 or 4 eggs are laid. Eggs are white coloured. Food consists of insects and insect larvae. Tree felling and deforestation are major threats to the species

Rufous Woodpecker, *Celeus brachyurus* (Oriya: Katha hana chadhei) is a chestnut-rufous woodpecker, cross-barred with black on wings and tail. The birds are seen in pairs

in thin deciduous forest. It is a typical woodpecker commonly seen in open secondary jungles. The birds are distributed practically throughout the state in the plains and hills up to about 1500 m. They make a high-pitched, quickly-repeated nasal call very like one of the more familiar calls of the Common Myna.

A crescent shaped crimson patch of feathers under eye is commonly seen in male; absent in female. Otherwise sexes alike. Nesting season of the species is chiefly between February to April. Nest resembles a hole excavated in the ball-shaped carton-like nests of tree ants, strangely enough while they are alive and swarming with the ferocious insects. Usually 3 eggs are laid.



Rufous Woodpecker at its nest-hole

Eggs are pure white, unglossed. The eggs and chicks, as well as the incubating parent, seem to suffer no harm from the ants amongst whom the brood is raised. Food consists of eggs, pupae and adults of tree ants (*Crematogaster*) obtained by digging with its bill into the arboreal carton-like nests of these insects. Occasionally eats the pulp of ripe banyan and other wild figs, and nectar of Silk Cotton and Coral flowers.

Lesser Golden-backed Woodpecker, *Dinopium benghalensis* (Oriya: Chhota Suna pithia Katha hana Chadhei) inhabits open tree and scrub jungle and is partial to mango topes, groves of old trees and coconut plantations. These birds work up on stems and branches of trees, in jerky spurts, directly or in spirals, occasionally sliding a few feet down in 'reverse gear', tapping on the bark and chiseling away rotten wood for beetles and insects hiding in the crannies.

Nesting takes place between March to August. Nest is made in an unlined hollow in a tree stem or branch, excavated by the birds, 2 to 10 m up from the ground. Usually 3 eggs are laid. Eggs are glossy china white in colour. Both sexes share all domestic duties. Black ants, sometimes taken on ground, form a considerable proportion of its diet. Sometimes pulps of ripe fruit as well as flower nectar are also eaten. In males, upper plumage golden yellow and black; lower buffy white streaked with black, more boldly on breast. Crown and occipital crest crimson. Female similar, but with fore crown black stippled with white, and only occipital crest crimson. Both sexes share all domestic duties. Tree felling and deforestation are threats to their survival.

Indian Grey Hornbill, *Ocyrceros birostris* are found in small groups in lightly-wooded country with groves of ancient trees. The birds are mainly arboreal. Commonly met with



Golden-backed woodpecker feeding her chicks



Common Grey Hornbill

among fig-laden banyan and peepal trees along roadsides or near villages, feeding in company with green pigeons and other frugivorous birds, or flying across from one tree to another in follow-my-leader fashion.

It is a clumsy brownish grey bird with an enormous black-and-white curved bill surmounted by a peculiar protuberance or casque, and long graduated tail. In female the casque is smaller. Nesting season of the species is between March to June. Nest is made in a natural tree-hollow, walled up with the bird's droppings after the female has settled herself within, leaving only a narrow slit through which the male feeds her during the self-imposed confinement during the incubation period. The wall is broken down after the young hatches out, and both parents forage for the young thereafter. Usually 2 to 3 eggs are laid. Eggs are dull, glossless white in colour. Food consists of mainly fruits, but also feed on large insects, lizards, young mice, etc.

Threats to hornbills include forest fire, deforestation, brush wood collection for cooking, Collection of breeding adults for meat and medicinal purposes, etc.

Malabar Pied Hornbills, *Anthracoceros coronatus* (Oriya: Raj Kochila Khai) constitute a widely known group of birds, due to their large sizes and strange-looking casques. But only a few are aware of the fact that stranger still is their nesting behaviour. Come summer, and the Hornbill pair scouts around for a suitable nesting site. Mostly it will be a natural hollow in a tree-trunk about 5-10 metres high; occasionally an existing cavity is deepened by the birds to suitable size. Once ready for laying eggs, the female enters the hollow; thereafter, the entrance is sealed with a mixture of wet mud (collected by the male and daubed from outside) and the female's excreta from inside. The birds



A male Malabar Pied Hornbill at nest



Common Grey Hornbill feeding its young

use their flattened beak like a trowel for plastering the entrance, with the skill of a seasoned mason.

The female remains inside, incubating the eggs during a period of voluntary incarceration which extends to 3-4 weeks. Throughout this period she is fed by the male through a narrow slit left open in the sealed up entrance. Once the chicks hatch and is about a week old, the male breaks open the wall to release the female. It is rebuilt again after she has emerged. Thereafter both the parents take turns feeding the growing nestlings, till the time they are ready to come out. It is not known whether the final act of breaking free is done by the parents, chicks or by both. All the three species of Hornbills in Orissa, show the same behaviour, although finer details like incubation period etc. still remain unknown. The pioneering ornithologist of the state, Dr. U.N.Dev has written a series of fine articles detailing the upbringing and habits of a pair of baby Malabar Pied Hornbills.

It is left to the present day naturalists to carry on with studies like this and fill in the missing blanks. Unfortunately, Hornbills are poached by people who believe that its meat has medicinal properties. Coupled with gradual destruction of their forest homes, this has led to the gradual decline of these magnificent birds. Similipal and Satkosia gorge are the strongholds of these birds in Orissa. Females differ only in colour details of bare parts. Nesting season of the species is between March to June. Usually 4 to 5 eggs are laid. Eggs are white, usual wood stained and brownish in colour. Although mainly frugivorous they also eat lizards, mice and baby birds.



Spotted Owlet and chicks



Barn Owl with chicks

Spotted Owlet, *Athene brama* (Oriya: Pecha) are rarely seen in day time, and are nocturnal. They prefer to spend the daytime in hollows of tree-trunks on a covered perch or on any branch. They fly out at dusk from the roosting places in search of prey. They forage and remain active during greater part of night.

There is no sexual dimorphism in these birds. Nesting season of the species is chiefly between January to April. Usually 2 to 4 eggs are laid. Eggs are white coloured and roundish oval in shape. Nest is made on an untidy pad of tow or fibers in tree hollows, holes in crumbling walls, or between ceiling and roof of deserted as well as occupied dwellings. Both sexes share all the domestic duties. Food consists of mostly beetles and other insects. Young birds, mice and lizards, etc. are also eaten.

These birds are seen in pairs or family parties, about villages, in ruins, and groves of ancient trees, and their survival is threatened with nest destruction, forest fire, tree felling, etc.

Barn Owl, *Tyto alba* (Oriya: Laxmi Pecha). These birds are seen singly or in pairs around deserted buildings and surrounding areas. Deserted buildings and cities, ancient forts and ruins invariably are their favoured habitat. They are purely nocturnal. The birds spend the daytime standing upright and dozing in some dark niche.

Nesting season undefined. They breed practically throughout the year. Nest is made by utilising a collection of straw, twigs, rags and rubbish padded into tree-hollows, holes in ruined walls, or in the space between ceiling and roof of a dwelling house. The same nesting site is used year after year. These owls feed almost exclusively on rats and mice. Therefore it has great economic usefulness.

FLOATING OR SEMI-AQUATIC NESTS

Common Coot, *Fulica atra* (Oriya: Juhi Chadhei) are seen gregariously, on tanks and other small and large water bodies.

Nesting takes place between July/August. Nest look like a large compact mass of rushes among matted reeds slightly above water level. Usually 6 to 10 eggs are laid. Eggs are buffy stone-coloured, spotted with reddish brown or purplish black. Food consists of grass and paddy



Common coot eggs and a just hatched chick

shoots, aquatic weeds and insects, molluscs, etc.

Purple Moorhen, *Porphyrio porphyrio* (Oriya: Kama Chadhei) are found in reedy swamps, and margins of water bodies overgrown with rushes. They become particularly noisy during breeding season. Male has a ludicrous courtship display, holding water weeds in its bill and bowing to female with loud chuckles. Pairs or small groups are normally seen in swampy reed-beds. Food consists of shoots and vegetable matter; also insects and molluscs.

Both males and females are similar in appearance. Nesting season of the species is chiefly between June to September. Nest is made up of a large pad of interwoven reed flags, etc., on a mass of floating debris or amongst matted reeds slightly above water level. Usually 3 to 7 eggs are laid.

Eggs are pale yellowish stone to reddish buff, blotched and spotted with reddish brown. These birds are trapped and killed for meat purpose by the local people.

Common Moorhen, *Gallinula chloropus* move in pairs or gregariously on partially submerged weeds and hydrophytes. While swimming they look like small ducks. They are seen in marshy areas, jheels, small and large water bodies, etc. In Chilika lagoon Common Moorhen are seen nesting in the marshy areas along with other aquatic birds.



Nest and eggs of Purple Moorhen



Incubating Purple Moorhen



Nest with eggs of Common Moorhen

The nesting season is June to September. They prepare a bulky nest of weeds and available vegetation on the ground. Five to twelve eggs are laid.

Water Cock, *Gallicrex cinerea* (Oriya: Pani Kukuda) In non-breeding plumage both sexes are dark brown, scalloped with fulvous above, pale buffy brown with wavy darker bars below. Breeding male looks black, with a bright red fleshy 'horn' above crown, and bright red legs and eyes.



Nest and eggs of water cock

Males are highly pugnacious in breeding season. Nesting takes place

between June to September. Nests look like a deep cup-shaped pad of sedges, grass, etc., in a flooded rice field or reedy marsh. Usually 3 to 6 or 8 eggs are laid. Eggs are varying from white or pinkish to brick-red, longitudinally blotched and spotted with reddish brown. These are largely vegetarian, feeding on seeds, and green shoots of rice, etc. These birds also feed on insects and molluscs. Water cock is restricted to a few selected water bodies like Chilika and Bhitarkanika where they breed. Destruction of eggs by predators like monitor lizards, etc. and even by man are the main threats to their population.

White breasted Waterhen, *Amauronis phoenicurus* (Oriya: Dahuka) are seen singly or in pairs, near reeds and thickets, on marshy ground, small and large wetlands, etc. Ordinarily shy and silent, but exceedingly noisy during the rainy season when it breeds. There is no sexual dimorphism. Nesting takes place between June to October. Nest looks like a shallow cup of twigs, creeper stems and flags of bushes, up in a bush near water. Usually 6 or 7 eggs are laid. Eggs are cream or pinkish white in colour, streaked and blotched with reddish brown. Food consists of insects, worms, molluscs, grain and shoots of paddy and marsh plants. Loss of wetlands, nest destruction, fishing activities by use of drag nets in shallow waters, stealing of eggs from the nests are the major threat factors to their survival.

Blue- breasted Rail, (*Gallirallus striatus*) are restricted to a few water bodies such as Chilika, Bhitarkanika and Hirakud reservoir. Nesting takes place between June to October. Nest looks like a pad of matted vegetation about 25 cm across on the ground or amidst reeds, hidden amongst marsh vegetation. Usually 5 or 7 eggs are laid. Eggs are cream or darker, smooth, glossy, blotched and spotted with red or purple. Both sexes share

parental duties. The birds are omnivorous. Loss of wetlands, nest destruction, fishing activities by use of drag nets in shallow waters, stealing of eggs from the nests are the major threat factors to their survival.

Pheasant-tailed Jacana, *Hydrophasianus chirurgus* (Oriya: Dala Khumpi) are restricted to marshy areas and wetlands like Chilika, Hirakud, Bhitarkanika, etc. Non-breeding birds are chiefly pale brown and white, with a black 'necklace' on upper breast and minus the sickle-shaped 'pheasant' tail.

There is no sexual dimorphism. The birds are seen singly, or gregariously on vegetation-covered water bodies. Nesting takes place between June to September. Nest looks like the same as in Bronze-winged Jacana; sometimes lays directly on floating plants and weeds. Usually 4 eggs are laid. Eggs are peg-top shaped, glossy greenish bronze or rufous-brown, unmarked. Food and feeding habits are same as of Bronze-winged Jacana consisting of vegetable matter, aquatic insects, and molluscs. The population of the birds are threatened due to loss of wetlands, nest destruction, fishing activities by use of drag nets in shallow waters, stealing of eggs from the nests, predation by raptor birds like kites and eagles and even by crows.



Jacana incubating eggs

Bronze-winged Jacana, *Metopidius indicus* (Oriya: Kali Jhilei or Dala Khumpi) are seen singly or gregariously on vegetation-covered water bodies such as water lily. There is no sexual dimorphism. They become noisy during the breeding season. Nesting takes place between June to. Nests look like a skimpy pad of twisted weed-stems, etc.,



Floating nest of Bronze winged Jacana



Floating nest and eggs of Pheasant-tailed Jacana

on floating leaves often partially submerged, or amongst marginal rushes. Usually 4 eggs are laid. Eggs are glossy, handsome, bronze - brown with an irregular network of blackish scrawls. Females are polyandrous. Food consists of seeds, roots, etc., of aquatic plants as well as insects and mollusk.

Loss of wetlands, nest destruction, fishing activities by use of drag nets in shallow waters, stealing of eggs from the nests, predation by raptor birds like kites and eagles and even by crows are the measure threats to their survival.

CUP NESTS OF GRASS, FIBRE, ETC.

Black Drongo, *Dicrurus macrocercus* (Oriya: Kajalapati) are seen singly, on the open countryside and near cultivation. It is a familiar bird usually seen perched on telegraph wires, or attending on grazing cattle. It rides on the backs of grazing cattle and takes toll of the insects disturbed by the animals' movements through the grass. From various exposed look-outs it keeps a vigilant watch for grasshoppers and other insects. Forest fires or fire-affected grass patches invariably attract numbers of drongos for the same reason. These birds are highly beneficial to agriculture by the vast quantities of injurious insects it destroys.

There is no sexual dimorphism. Nesting takes place between April to August. Nest is made in a fork at the extremity of branches about 10 feet up in large trees preferably standing alone in the open and is made as a cup of fine twigs and fibers cemented with cobweb. Usually 3 to 5 eggs are laid. Eggs are variable in colour mostly whitish with brownish red spots. Both sexes share all domestic duties and are bold in defence of their nest. Food consists of insects; occasionally small birds are also eaten.

Eurasian Golden Oriole, *Oriolus oriolus* (Oriya: Haladi Basanta) These birds are found singly or in pairs, among leafy trees in wooded country. It is a colourful bird with bright golden yellow with black in wings and tail, and a conspicuous black streak through the eye. Arboreal in habits, these birds are a dweller of open but well-wooded country, partial to groves of large trees around villages and cultivation, and in gardens as well as along roadsides even in noisy towns.



Golden Oriole at its nest



Black Drongo at its nest

Female looks duller and greener. Nesting takes place between April to July. Nest looks like a beautifully woven deep cup of grass and fibers bound with cobweb of leafy twig. Usually 2 to 3 eggs are laid. Eggs are white, spotted with black or reddish brown. Both sexes share all domestic duties. Food consists of insects, banyan and peepul figs and other fruits and berries; also flower nectar.

White-browed Fantail Flycatcher, *Rhipidura aureola* (Oriya: Kanak Chadhei) is a restless dark sooty brown flycatcher. These flycatchers usually keep in pairs and restrict themselves to a prescribed locality; frequently joining up mixed hunting parties of small insectivorous birds.

There is no sexual dimorphism in these birds. Nesting takes place between February to August. Nest resembles a neat compact cup of fine grass, plentifully plastered with cobwebs on the outside, rounded off at the bottom like an lora's, placed in a fork of a twig. Usually 3 to 4 eggs are laid. Eggs are pale pinkish cream, with a ring of tiny brown specks around broad end. Both sexes share in nest building, incubation and care of the young. Food consists of insects, chiefly flies, bees and wasps. Threats include forest fire, deforestation, etc.

White-throated Fantail Flycatcher, *Rhipidura albicollis* (Oriya: Kanak Chadhei) is a restless smoke-brown coloured bird. Its most striking feature is the perky, cocked and fanned-out tail with wings drooping on either side. It is seen in pairs, in wooded country, shrubbery, gardens, etc. It inhabits secondary jungles, gardens, groves and shrubbery even amidst noisy towns. Flits tirelessly in foliage and on ground. Launches graceful aerial looping-the-loop sallies after flies. Nesting takes place between March to August. Nest resembles a beautiful neat cup of fine grass and fibers, copiously plastered outside with cobweb, in a crotch or fork of twig usually above 3 inch up from the ground level. Usually 3 eggs are laid. Eggs are pinkish cream coloured with a ring of minute brown specks round the broad end. Both sexes share domestic duties. It feeds on flies and gnats, etc.



Male Paradise Flycatcher
feeding its chicks



Female Paradise Flycatcher feeding her chicks

Asian Paradise Flycatcher, *Terpsiphone paradisi* (Oriya: Kanak Chadhei) are mainly seen in the forested areas and they are also seen in the shady groves and gardens and even near human habitations. The adult male is silvery white with metallic black crested head and two long narrow ribbon-like feathers in the tail. The female is like a bulbul in overall appearance with grayish white below.

They usually breed in February to July and prepare a compact cup like nest woven by fine grasses and fibres, plastered outside with cobwebs built in the crotch of a twig 2 to 4 m up. 2 to 5 eggs are laid which are pale creamy pink and blotched with reddish brown. Both sexes share parental duties.

Common Iora, *Aegithina tiphia* (Oriya: Soubhagi) is a black and yellow tit-like bird with two white wing bars. It is arboreal, frequently seen in gardens in towns, groves of trees (mango, tamarind, neem, etc.) on village outskirts, and secondary jungle areas. Normally hops from twig to twig, frequently clinging on sideways or upside down in search of insects among the foliage.

Female, and male in non-breeding plumage, largely greenish yellow with whitish wing bars, the latter differentiated by black tail. The birds keep in touch with each other by sweet long-drawn musical whistles and short chirrups.

During courtship display, the male springs up into the air with plumage fluffed out and with a variety of sibilant whistles parachutes down in a spire back to his perch, showing off his colours to the best advantage. Nesting takes place between May to September with local variations. Nest resembles a compact cup of grasses, neatly and copiously plastered with cobwebs, in a crotch or fork of twig 2 to 4 inch up from the ground. Usually 2 to 4 eggs are laid. Eggs are pale pinky white, blotched with purplish brown colour. Both sexes share parental duties. Food consists of insects, their eggs and larvae.

Scarlet Minivet, *Pericrocotus flammeus* (Oriya: Jungle Sundari) are sexually dimorphic. Adult male black on nape, head back and tail with orange red to deep scarlet under parts with two yellow bars on black wings. Female and young male grey above, yellow below with two yellow bars on black wings. In flocks on canopy of trees in dense and open forest. Insectivorous in habit.

Nesting takes place between April to July. Nest look like a tidy cup of rootlets and plant fibres bound with cobwebs and bedded with moss, bark and lichens, secured on the upper side of a branch. Eggs- 2 to 4, pale or greenish, spotted and blotched with brown. Both sexes share parental duties.

Red-vented Bulbul, *Pynconotus cafer* (Oriya: Champa or Gobara Chadhei) is an energetic playful smoke-brown coloured bird with a conspicuous crimson patch below root of tail, and a white rump. The birds are seen in pairs or in small gatherings in gardens and light scrub jungle, both near and away from human habitations. Large

numbers of birds often collect to feed on banyan and peepul figs and winged termite swarms. The birds have no song as such, but its joyous notes and vivacious disposition make it a welcome visitor to every garden.

Nesting takes place between February and May, varying with local conditions. Nest is made as a cup of rootlets, sometimes plastered outside with cobwebs, in a bush or tree, 1 to 10 inch (3 to 30 ft) up. Usually 2 to 3 eggs are laid. Eggs are pinkish white, profusely blotched with purplish brown colour. Both sexes share parental duties. Food consists of insects, fruits and berries, peas, vegetables, and flower nectar.

Red-whiskered Bulbul, *Pycononotus jocosus* (Oriya: Chulia or Dalachampa Gobara Chadhei). The species prefers better-wooded localities than the Red-vented bulbul and commonly found in hills up to 2500 m often to the exclusion of the latter. Sometimes the two species are found side by side, but normally the habitat preferences are marked. These birds often enter the gardens, and are usually tame and confiding. Its joyous querulous notes are rather similar to those of the Red-vented Bulbul, but more musical and readily distinguishable.

There is no sexual dimorphism in these birds. The birds are seen in pairs or loose gatherings. Nesting takes place between February to August and is locally variable. Nest is like the other bulbuls', made up of a cup of fine twigs, rootlets, grass, etc. Nests are frequently built in thatch walls or roofs of inhabited huts. Usually 2 to 4 eggs are laid. Eggs are pinkish white, profusely blotched with purplish brown colour. Both sexes share parental duties. Food consists of berries and insects.

Indian Pitta, *Pitta brachyura* (Oriya: Nabarangi) are resident and locally migratory birds found in well-wooded portions of the state and is fond of dry nullahs and ravines with tangled undergrowth.

There is no sexual dimorphism in these birds. Nesting season of the species is between May to August. Nest is large, globular and made up of twigs, grass, roots, etc., on ground under a bush or more commonly up in the fork of a low tree. Usually 4 to 6 eggs



Red-whiskered Bulbul chicks at nest



Indian Pitta

are laid. Eggs are glossy white in colour with spots. Food consists of insects and grubs. Forest fire, deforestation, brush wood collection for cooking, etc are threats to Pitta.

Common Babbler, *Turdoides caudatus* (Oriya: Kunda Khai or Chee Chee Chadhei) have a preference for dry open and semi-desert areas with thorn scrub and shrubby vegetation. They usually avoid humid forests. The birds feed on the ground and scuttle along like rats through thorn scrub and thickets. Flight feeble - a few rapid flaps followed by a glide on outspread wings and tail.

Both males and females are similar in appearance. Flocks of a half dozen or more are commonly seen on the ground or in low bushes. Nesting takes place between March and July, but irregularly over the entire year. Nest is made up as a neat compact cup of grass and rootlets in a low thorny bush, seldom over 2 m up. Usually 3 to 4 eggs are laid. Eggs are stone coloured, glossy. Both sexes share domestic duties. Nests are commonly parasitized by Pied Crested and Hawk-Cuckoos. Food consists of insects, berries, grain and flower nectar. Threats to Babbler include brush wood collection for cooking.

Grey Shrike, *Lanius excubitor* (Oriya: Ababila) inhabit dry and semi-desert portions of the state including dry cultivation interspersed with patches of thorny scrub and waste land. There is no sexual dimorphism in these birds. The birds are seen singly, on bush tops in dry open country. Nesting season of the species is between January to October, chiefly March/April. Nest resembles a deep cup of thorny twigs, with grass, rags, wool or feathers as lining. Nest is made in thorny trees between 2 and 4 m up from the ground. Usually 3 to 6 eggs are laid. Eggs are variable in colour, mostly pale greenish white blotched and spotted with purplish brown, especially at the broader end. Food consists of locusts, lizards, mice, etc. Shrikes are known as Butcher Birds from their habit of killing more than needed immediately for food, and storing the surplus impaled on thorns. Threats include forest fire, deforestation, brush wood collection for cooking, etc.

SIMPLE SCRAPES AS GROUND NESTS

Indian Peafowl, *Pavo cristatus* (Oriya: Mayura) are found in small groups in deciduous forest areas. These birds are also seen locally in semi-domesticated condition where these are protected by religious sentiment. These birds inhabit dense scrub and deciduous jungles - both in plains and foothills - preferably in the neighborhood of rivers and streams.



Indian Peafowl

They are polygamous; usually one cock is found with 4 or 5 hens. These are always excessively shy and alert. The bird slinks away through the undergrowth on its legs, and flies only when suddenly come upon, or to cross a ravine or open river bed. The birds roost at night in large trees. Cock display before his bevy of hens erecting and fanning out his showy train, and strutting and posturing to the accompaniment of paroxysms of quivering. Such prominent courtship behaviour is a common sight in rainy season particularly during cloudy weather. Nesting of both normal and white variety Peafowls in large numbers can be seen in Dealia, Gangapatna and Daspur hills coming under City Forest Division which is close to the state capital Bhubaneswar. Nesting takes place between January to October. Nest is made like a shallow scrape in the ground in a dense thicket, lined with sticks and leaves. Usually 3 to 5 eggs are laid. Eggs are glossy pale cream in colour. Food consists of grains, vegetable shoots, insects, lizards, snakes, etc.

Threats to Peafowl include indiscriminate collection of eggs, chicks and adults by local tribes for the pet trade. Feathers are also collected and used for religious performances. Eggs and chicks are vulnerable to forest fire. Eggs are known to be collected by tribals for incubation under a brooding hen and then sold off to soliciting customers.

Red Jungle Fowl, *Gallus gallus* (Oriya: Bana Kukuda) is considered as the ancestor of all domestic breeds of fowl. Usually a cock and 3 or 4 hens come out in the early mornings and afternoons to feed in stubble fields at the edge of forest, or on forest roads and fire lines, etc. The birds are very shy and roost up in big trees or bamboo clumps.

These are seen in pairs or in small groups in scrub, Sal jungle as well as mangrove forests. The distribution pattern of Red Jungle fowl almost completely overlaps distribution of Sal Tree (*Shorea robusta*) and Swamp Deer (*Cervus duvauceli*). In Red Jungle fowl, the hen differs from cock in being plain streaked brown with rufous-brown under parts. These are distributed in forested areas in all over the state.

Nesting takes place between March to May. Nest looks like a shallow scrape in dense undergrowth, lined with dry leaves. Usually 5 to 6 eggs are laid. Eggs are like the domestic fowl's. Cocks are apparently monogamous. The birds are omnivorous. Food consists of grains, vegetable shoots, insects, lizards, etc.

Collection of eggs and adults by local tribes for consumption as food threaten their survival.

Grey Francolin or Partridge, *Francolinus pondicerianus* is a stub-tailed grayish brown bird with chestnut blotching above and fine black vermiculations and rufous buff throat. It is a resident of thorn-scrub and grass country. The birds scratch the ground for grain, seeds, termites and larvae, etc.

Nesting takes place through out the year. Nest look like a grass-lined scrape in scrub jungle, grass land. Usually 4 to 8 cream coloured eggs are laid.

Painted Bush Quail, *Perdica erythrorhyncha* (Oriya: Chitrita Titiri) is a brightly coloured quail with deep red bill and legs and semi-lunar markings on the sides. Female has brick red under parts. These are found in grassland and forest edges.

Nesting takes place through out the year; Nest look like a scrape on ground at the root of a bush or grass clump, sometimes thinly lined with grass. Usually 4 to 7 creamy buff eggs are laid. Nests, eggs and hatchlings are vulnerable to forest fire.

MUD NESTS

Dusty Crag Martin, *Hirundo concolor* is a sooty brown, square-tailed swallow like bird seen around cliffs, rock caves, ancient forts and buildings. Hawks for tiny winged insects constantly uttering chit-chit during flight.

Nesting takes place between June to October, when wet mud is available for nest building. Nest is a deep oval saucer of mud-lined with feathers, vegetable fibres, etc. The saucer- shaped nest is attached to a natural overhang or cliff or archway of buildings. Usually 2 to 3 eggs are laid minutely speckled and spotted with reddish brown. Both sexes share domestic duties.

Red-rumped Swallow, *Hirundo daurica* is a glossy deep blue sparrow sized swallow with forked tail, chestnut rump (indicative of the name) and white underparts finely streaked with dark brown. Parties seen around cliffs, ancient forts, ruined buildings as well as open country. Hawks around with Martins and swifts for winged insects.

Nesting takes place between April to August, Nest is a retort shaped structure of plastered mud with a narrow tubular entrance, stuck flat against the ceiling of a high building, rock cave or overhang. The spherical egg chamber is lined with feathers. Eggs are 3 or 4 pure white; both sexes share in nest building and feeding.

Common Swallow, *Hirundo rustica* are highly gregarious usually seen resting on telegraph wires. In winter they are distributed throughout the state. There is no sexual dimorphism in these birds. Nesting season of the species is mainly between April to July. Often two successive broods are raised. Nest is made of mud reinforced with grass. Nests are commonly built against beams and rafters within dwelling houses and stables. Usually 4 to 5 eggs are laid. Eggs are white in colour and spotted with redish brown. Both sexes share all domestic duties. Food consists of chiefly flies.

Malabar Whistling Thrush, *Myiophonus horsfieldii* is a locally known as Bhrungaraj in Oriya. A blue-black thrush with patches of glistening cobalt blue on forehead and shoulders, legs and bill black, solitary or in pairs. A resident of well wooded rocky hill streams. Male has a rich human-like whistling song (hence, the name). Seen in Sambalpur, Bonai and Similipal hills. Feeds on aquatic insects, snails and crabs.

Nesting takes place between February to August; Nest look like a large compact pad of roots and grasses reinforced with mud. The nest is placed on a shelf or ledge of precipitous rock flanking a hill torrent.

Usually 3 to 4 eggs are laid. Eggs are pale buff, grayish, blotched and speckled with grayish brown. Both sexes share parental duties.

WOVEN, OBLONG, PURSE-TYPE NESTS

Ashy Prinia, *Prinia socialis* is known in Oriya as Phutki or Kali Phutki because of its habit of hopping about quietly among bushes, shaking its tail. Affects shrubbery in gardens, reeds bordering streams, moist grass lands and scrub. Ashy slate above, fulvous white below with longish, graduated black and white tipped tail. The way it is carried erect and constantly shaken up and down is characteristic.

Nesting takes place between March to September mainly after onset of monsoon. Nests are of two types: (i) like a tailor bird's in a funnel of stitched leaves, and (ii) an oblong purse of woven fibres tucked and bound with cobweb to the supporting leaves of a low bush. Usually 3 or 4 eggs are laid. Eggs are glossy brick-red with a dark ring round the broad end. Both sexes share domestic duties.

House Sparrow, *Passer domesticus* (Oriya: Ghara Chatia) are inseparable from human habitations and are widely distributed throughout the state. These are undoubtedly our most familiar bird. It is a confirmed associate of man, in hills and plains alike, whether in a bustling noisy city or outlying forest hamlet.

Male birds are with grey crown and black lores. The colour behind the eye, sides of neck and upper back is chestnut. Back rufous-chestnut, black streaked. They have white shoulder patch on rufous wing. Tail dark brown in colour. Females are ashy grey-brown above, streaked with blackish and rufous, and with a pale fulvous supercilium; fulvous ashy white below.

Sometimes the species collects in enormous flocks and does damage to ripening crops and in market gardens. Non-breeding birds have favourite community roosts in leafy trees, where large numbers foregather with much noise every evening. Chirping call notes too well known.

There is no well-defined nesting season. It nests practically throughout the year, the most favoured months varying with locality. Nest is made on a collection of straw, rubbish and feathers in a hole in ceiling, niche in wall, inverted lamp shade, and every conceivable site within or without an occupied building. Usually 3 to 5 eggs are laid. Eggs are pale greenish white, stippled and blotched with brown colour. Several successive broods are often raised. During the breeding period, the song of the breeding male is a

loud, monotonous, "tsi, tsi, tsi", or "cheer cheer cheer" uttered as it fluffs out its feathers, arches its rump, droops its wings and struts about arrogantly, twitching its partly cocked tail. House Sparrow are omnivorous. Food consists of grain, insects, fruit buds, flower nectar and kitchen scraps. Threats: Indiscriminate use of pesticides in agricultural practices. These birds have become rare in recent years due to rapid urbanization.

Indian Baya, *Ploceus philippinus* (Oriya: Baya Chadhei) are resident as well as locally migratory birds. The hen Baya is dark-streaked fulvous brown above, plain whitish fulvous below. It has a stout conical bill, short square-cut tail.

Flocks of these birds, sometimes of considerable size, glean paddy and other grain in harvested fields. Occasionally damages ripening crops. The birds roosts in enormous numbers in reed-beds bordering tanks, etc. Its seasonal local movements are largely governed by paddy and cereal cultivation which provide both nesting material and food. Also feeds on berries, flower nectar, moths and other insects. They usually make a sparrow-like "chit-chit-chit" calls. In breeding season males follow these up by a long drawn joyous "chee-ee" uttered in chorus, accompanied by flapping of wings in unison while weaving their nests in a colony.

Breeding male has bright yellow crown and upper parts dark brown streaked with yellow. They have yellow breast, cream buff on under parts. Flocks are seen in open cultivated areas. Nesting season of the species is between May to September, coincident with the South West monsoon and paddy cultivation. Nest resembles a swinging retort-shaped structure with long vertical entrance tube, compactly woven out of strips of paddy leaf and rough-edged grasses, suspended in clusters from twigs, usually over water. Blobs of mud, collected when wet, are stuck inside the dome near the egg-chamber. Usually 2



Male Baya at nest



Borassus palm studded with pendant nests of Baya Weaver birds

to 4 eggs are laid. Eggs are pure white. There is clear division of labour in so far as the nest building as well as incubation of the egg is concerned. Male alone builds the nest; female alone incubates the eggs.

The loss of big trees such as palm tree used for perching and nesting threaten the survival of Baya.

Black-headed Munia , *Lonchura malacca* (Oriya: Baramasi Chadhei) are seen in swampy low-lying and ill-drained areas with feathery grass and reeds, and the vicinity of wet paddy cultivation close to forest areas. Otherwise the habit, food and voice is same as in all the other munias. Food consists of chiefly grass seeds.

Both males and females are similar in appearance. Flocks of these birds are mostly seen on marshy tall grasslands. The species breeds in the monsoon months. Nesting season of the species is chiefly between June to October, varying with local conditions. Nest is made with a large ball of coarse grasses, lined with finer grass, with a lateral entrance hole. Nest is built in low bushes or amongst coarse grass stems. Usually 5 to 7 eggs are laid. Eggs are pure white in appearance.

Purple Sunbird, *Nectarinia asiatica* (Oriya: Baigani Fula Chuin) inhabit gardens, groves, cultivated and scrub country as well as deciduous forests.

Nesting season of the species is between March to May. Nest is an oblong pendulous pouch of soft grasses, etc. Usually 2 to 3 eggs are laid. Eggs are grayish- or greenish white marked with various shades of brown and grey colour. Only the female builds the nest and incubates the eggs. However, the male assists in feeding the young ones after completion of hatching. Food consists of insects and spiders, and largely flower nectar. The birds inhabit gardens, groves, cultivated and scrub country as well as light deciduous forest. Pairs are seen in open lightly-wooded country.



Purple Sunbird pair at nest



Black-headed Munia nest

Yellow-wattled Lapwing, *Vanellus malabaricus* (Oriya: Tein-teini) inhabits dry open country and fallow land and is less dependent upon the neighbourhood of water. They are also less noisy and demonstrative.

There is no sexual dimorphism. It is seen in pairs, or small groups, on dry waste lands. These are resident and locally migratory birds. Nesting takes place between April to July. Usually 4 eggs are laid. The eggs resembles those of typical 'plovers' in shape, buff to olive stone-coloured, irregularly blotched with dark brown and purplish grey colour. The eggs are laid on bare soil in dry wasteland, with the scrape sometimes encircled by pebbles. Both eggs and newly-hatched downy chicks are remarkably obliterative in their natural environment. The parents demonstrate noisily when the nest or young ones are in danger, circling overhead frantically and diving at the intruder. Food consists of insects, grubs, molluscs, etc. Nests get destroyed due to trampling by grazing cattle.

Red-wattled Lapwing, *Vanellus indicus* (Oriya: Ranga Batuani) is a familiar plover, producer of the well-known "Did-he-do-it?" calls.

These birds are commonly seen in open country, ploughed fields, grazing land, and margins and dry beds of tanks and puddles. The species is also met with in forest areas around rain-filled depressions. The bird runs about in short spurts and dips forward obliquely to pick up food in the typical plover manner.

Scattered Pairs are seen near tanks and other water bodies. The birds are ceaselessly vigilant, day or night, and foremost to detect intrusion and raise the alarm. This behaviour is more prominent during the breeding season. Nesting takes place between March to August. Usually 4 eggs are laid. The eggs are of stone colour or grayish brown, blotched with blackish colour; peg-top shaped. Eggs are laid on bare ground in open wasteland, with the depression ringed around with a few pebbles. They match the soil to perfection and are difficult to find. Food consists of insects, molluscs, etc.



Red-wattled Lapwing pair at their ground nest



Yellow-wattled Lapwing incubating eggs

Eastern Skylark, *Alauda gulgula* is essentially a bird of grassy meadows and open cultivation found in both plains and hills. The birds are particularly fond of damp grasslands bordering water bodies.

There is no sexual dimorphism in these birds. The breeding period is variable. Nesting season of the species is mainly between February to July. Nest looks like a cup-like depression in the ground. They also nest in holes of building both inhabited and uninhabited. One such nest was located in one of the hostel of Sambalpur University. Usually 2 to 4 eggs are laid. Eggs are pale brownish grey or whitish, spotted and streaked with brown. The birds feed on ground on seeds and insects.

Forest fire, deforestation, brush wood collection for cooking, etc are some of the threats to Skylark.

Common Indian Nightjar, *Caprimulgus asiaticus* (Oriya: Bhuini Chhapuli) is a nocturnal bird. These birds frequent scrub and stony country, dry overgrown nullahs, compounds and groves in the neighbourhood of cultivation and human habitations. It spends the day squatting under shelter of a bush or along a low bough. The birds are very active after sunset, and all through the night, hawking insects. Flight is peculiarly moth like, silent and wandering - long sailing glides alternated with somewhat leisurely flapping of the wings.

There is no sexual dimorphism. Nesting season is not well-defined. However, nest is chiefly made between February to September. The eggs are laid on bare ground in bamboo or bush jungle. Usually 2 eggs are laid. The eggs are of pale pink to deep salmon coloured, spotted and blotched with reddish brown and inky purple. Food consists of beetles, moths and other insects. Nests get destroyed due to trampling by grazing cattle, ground fire, etc.



Common Indian Nightjar incubating eggs

Nesting season of **Crested Bunting, *Melophus lathami*** is between April to August. Crested Bunting prepares a nest under a stone or grass tuft on a hillside. Nest resembles a deep cup of grass lined with fine rootlets. Usually 3 to 4 eggs are laid. Eggs are pale greenish grey, freckled with purplish brown, densely at broad end. Both sexes share in nest building and feeding young. Food entirely consists of seeds.

Indian River Tern, *Sterna aurantia* (Oriya: Pani Dubuki) are seen gregariously, on rivers and other water bodies, flying up and down. Both males and females are similar in appearance. Nesting takes place between March to May. Usually 3 eggs are laid. Eggs are greenish grey with brown and purple streaks. Eggs are laid on bare ground on banks and islands of large and small water bodies in colonies. Food consists of chiefly fish but they also feed on crustaceans and other aquatic insects. The birds flies a few feet above the water with deliberate beats of the long, slender, pointed wings intently scanning the surface for fish venturing within striking depth. From time to time it plunges in with closed wings, often becoming completely submerged but soon reappearing with the quarry held across the bill. As it resumes its flight, the victim is jerked up in the air and swallowed head foremost. It feeds as fish, crustaceans, tadpoles and water insects are also eaten. Nest destruction by trampling, etc. is a threat to the species.

Gull-billed Tern, *Gelochelidon nilotica* (Oriya: Pani Dubuki) are usually seen in the costal mud flats, creeks, larges small water bodies , lakes and rivers inland. They nest in April to June. They prepare a slight depression in the soil lined with debris for nesting. Nest in mixed colonies. Two to three eggs are laid. Both sexes share parental duties.

Little Tern, *Sterna albifrons* (Oriya: Pani Dubuki) nest in small colonies on banks of rivers, small water bodies, lagoon, etc. The nesting season is May and June. The female prepares a shallow depression in the soil and lays two to three eggs. Eggs are sand



Little tern hatchlings showing cryptic colouration



Eggs of little tern on ground nest

coloured spotted or speckled with red. Both sexes share the incubation. Little terns are local migrants and they are seen in marshy areas / wetlands. In Chilika lagoon they nest in Nalban Island / Sanctuary.

Blackwinged stilt, *Himantopus himantopus* are seen in marshy areas or wetlands including two Ramsar sites such as Bhitarkanika and Chilika. Its stilt legs enable it to wade into comparatively deep water, where it probes into the slushy mud for worms, molluscs, aquatic insects, etc. The nesting season is April to August. They prepare the nests on the ground with available reed materials close to the Small water bodies , marshy areas/ wetlands. The female lays three to four eggs which is light colour, blotched with black.

There is no sexual dimorphism in **Indian skimmers, *Rynchops albicollis***. However, the females are smaller in size than the males. Nesting season of the species is between February to April. Nest looks like an unlined depression in the sand in a dry river bed or sandy islet amid stream. Usually 3 to 4 eggs are laid. Incubation is done apparently by females alone. Food consists of mainly fish. Nest destruction by trampling, etc. is a threat to the species.



Gull-billed tern pair at nest site



Hatchlings of Gull-billed tern



Incubating Blackwinged stilt



Nest and eggs of Blackwinged stilt

COLONIAL NESTING BY WATER BIRDS

One of the largest colonies of water birds in India is located in the mangrove forests of Bhitarkanika National Park. Eleven species of water birds nest in this colony that spread over an area of approximately four hectares. A total count of nesting trees and number of nests carried out in the second fortnight of August 2004 and 2005 revealed the presence of 13,704 nests and 11,287 nests, respectively. In a decreasing order of abundance, the various species are Asian Openbill, Large Egret, Little cormorant, Intermediate Egret and Little Egret. Asian Openbill accounts for nearly 66% of all the nests counted in the heronry. The count revealed a decline in the number of nests of Oriental Darters over the years, the reasons for which are yet to be ascertained. Seventy nine per cent (79%) of the nest trees are *Exoecaria agallocha*. Other tree species used by the birds for nesting include *Heritiera fomes*, *Cynometra iripa*, *Hibiscus tiliaceus*, and *Tamarix troupii*.

Although different species of Herons and Egrets vary in their habitat preference, diet and behaviour, they have certain common fundamental requirements for nesting. A good nesting site generally provides protection against predators, offer adequate stability and materials to support for construction of the nests, and there is access to adequate feeding areas within the foraging range. Further, the nest site also promotes hatching success and successful rearing of young, which is important for survival of individuals and the species.

Colonial nesting of water birds in other isolated sites: A few old and lofty trees of Tamarind (*Tamarindus indica*) standing on the outskirts of a lesser known village "Karlajori" in Bhatli Block of Bargarh District, located 1.5 km away towards north from the district headquarters, have been providing perching and nesting facilities to a variety of water

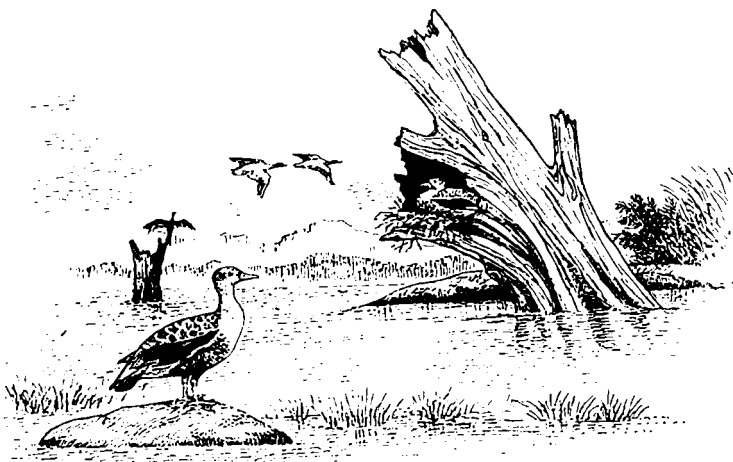


One of the largest heronry: Bhitarkanika

birds such as Egrets, Herons, Openbill storks, etc. As stated by the local people, these avian guests arrive at the village on the day of "Akshaya Trutia" (April-May) which is considered auspicious in the locality. The birds lay eggs, rear the young ones and start flying back to their parental home from "Diwali" (November) onwards and completely vacate the Winter abode by "Kartika Purnima"(October-November). Visit of these avian guests to this village has been going on for a long time. This village witnessed an arrival of 5000 such birds during the 2005 nesting season.

Colonial nesting by water birds at Nandankanan: Tall Banyan and other trees, within and surrounding the Gharial and Mugger crocodile pool enclosures at the Nandankanan Zoological Park have been providing safe nesting and roosting sites to a variety of local migratory water birds such as Open billed storks, Egrets (Median egret and Cattle egret) and herons (Pond heron, Night heron etc.) for a period of four months i.e., June to September. This is an annual feature and an estimated population of about 2000 birds nest and rear their young ones.

Apart from the nesting colonies described here, there are several others reported from different parts of the state, some of which have large congregations of water birds. Every such site is important in terms of conservation and has to be assiduously protected. In case of any such hitherto undocumented or unreported sites coming to the notice of readers, it is requested that the information be passed on to the authorities concerned. It is also requested that all support be given to the Forest Department by the local people for effective protection and conservation of such roosting and nesting trees.



'Freedom' redefined- on being in a tree hollow (Lesser whistling duck)

SCALY CARE (Nesting by Reptiles)

In the struggle for existence and survival of the fittest, Reptiles emerged successful as the first 'true land vertebrates'. Effective protection of eggs from desiccation holds the key to their success in the evolutionary process. Reptiles do not have to return to water, unlike their amphibian ancestors, to deposit the eggs.

All modern reptiles, — that encompass the crocodilians, chelonians (turtles), snakes and lizards —, deposit their eggs in a nest specially prepared by the female, or they simply lay the eggs under some convenient cover such as a rock, a log, a heap of leaves, a suitable hollow or cavity on the ground or a termite mound.

Parental care, — which is displayed in selecting a nesting site, protecting the egg, camouflaging the nesting site — where possible, attending the nest to bring out the hatchlings and raising the young ones in a nursery, — varies in complexity from species to species, as such manifestations are driven by the intelligence and physical ability of the parents and the quality of the habitat. Parental care among reptiles is best seen with **CROCODYLIANS**.

Gharial, *Gavialis gangeticus* (Oriya: Thantia, Ghadiala), the oldest living member among crocodilians and their sympatric **Mugger Crocodiles** (*Crocodylus palustris*. Oriya: Gomuha Kumbhira) live in freshwaters. Both these species of crocodilians are 'hole nesters' by habit.

Most of our knowledge on nesting by **Gharial** is from River Chambal, a tributary of Gangetic system in north-west India and rivers Narayani and Kali in Nepal, called Gandak in Bihar, from where eggs were collected for the Gharial conservation programme that was started in Orissa in the year 1975. Subsequently, information have come from the captive breeding programme in Nandankanan.

Sometime during March and April the mother crocodile digs a pit on the ground, lays the eggs in it and covers it back with sand and soil. About a month before actual nesting the



Nesting Gharial



Female Gharials guarding nest

mother may start exploring the nesting ground by scooping out a few 'trial nests', without actually using these to deposit eggs.

Nest depth depends on the length of the hind limb. In case of Gharial, the nest depth varies around 40 to 55cm with a width of about 35 to 45cm. The average size of the clutch is 45 but upto 96 eggs have been recorded from a single nest (from Girwa River, now in Uttaranchal).

The nests are located above the summer level of water and are normally safe from inundation due to any kind of early flood in the monsoon. After about 75 days incubation, before the time the river water starts rising due to flood, the hatchlings are already out and escape inundation.

Nests are, however, not safe from untimely release of water from reservoirs because selecting a proper nesting site and the method of nesting are adaptations acquired by a species over evolutionary time scale. Reservoirs are adverse modifications brought to Gharial habitats by humans.

To avoid high spates of flood, the mother escorts the hatchlings into creeks and nullahs that drain into the main river. Freshly hatched young Gharial measure around 35cm and weigh about 90gm. They piggy-ride the mother or the mother carries them in her mouth into the tributaries. Persons, who have seen the mother mouth-carrying the hatchlings, have wrongly spread a folklore that the mother eats away her own young ones, as a result of which, only a few hatchlings survive towards the time the flood recedes.

Gharial have limbs poorly adapted for terrestrial walk and, therefore, live in perennial rivers, and dig the nest-pit on sandy slopes close to deep water. The eggs remain at a height of 2-3m above the water level. Communal nesting, —several mothers using the same nesting bank—, is common in Gharial. This does not happen with the mugger as it is more intent about its territory.



Nest, Eggs and the Hatchling of Gharial

Mugger crocodile can lift its body above the ground and perform high walk over five to seven kilometers on land and, therefore, is not confined to perennial bodies of water. They are seen in rivers, lakes, reservoirs, ponds and sometimes, —particularly after the floods—, live in harmony in village tanks used by people and cattle. They rarely dig their nest on open river banks. Instead, they use a secluded place like one under the shelter of a rock-shelf or between random rubbles, in a space just enough to dig the nest pit. Nests as well as the eggs of mugger are smaller than those of Gharial.

The mugger female lays her eggs in a pitcher shaped hole about 35-45cm deep and 30 cm wide. The covered nest may be level with the ground or may show a slight mound. As with other crocodilians, the number of eggs in a clutch is related to the age and size of the female. A maiden clutch may have only 2 to 3 eggs, while an average clutch has 25 to 35 eggs. Eggs are white, hard shelled, and range in size from 75 x 55 to 82 x 50mm (length x width). Incubation period is around 60 to 70 days, but extends if the temperature in the nest chamber is maintained below 30°C. Like all crocodilians, the incubation temperature determines the sex of the developing young; lower temperature producing females and higher favouring the male.

The mugger female protects the nest by remaining either in water close to the nest or on the nest itself. The degree of protection offered by the female varies on individual temperament.

Egg predators are common for the Gharial and Mugger. These include pigs, jackals, mongooses and monitor lizards. Before the launching of crocodile conservation programme in Orissa, the Matia tribals living along the banks of river Mahanadi were habitual egg hunters and used the crocodile and Gharial eggs for their own consumption or sale as aphrodisiac. Hatchlings predated by raptor birds, large turtles and carnivorous fish. (Matias were inducted into activities under crocodile conservation.)

Mugger crocodile may actively defend the nest from intruders but the Gharial mother, being timid as she is, is not an active defender of the nest, Gharial keeps watch on her



Mother mugger helping the eggs to hatch



Mother with a mouthful of hatchlings ready to be taken to water

nest from the water's edge and around the hatching time, frequently walks upto the nest to listen to the yelps in chorus of hatchlings, while these are still within the egg and buried under earth. Most human attacks due to crocodilians occur due to nest-guarding mothers. Crocodiles, however, give adequate warning signals in the form of audible hissings.

Mugger crocodiles are seen in Balimela reservoir, Mahanadi river system, and the rivers in Similipal Biosphere Reserve. Captive breeding programme for Mugger crocodiles have been successful at Nandankanan Zoological Park and the Ramtirtha Crocodile Research Centre in Mayurbhanj.

Satkoshia Gorge trans River-Mahanadi is the only habitat left in Orissa for adult Gharial although some stretches of Mahanadi suitable for juveniles still exist around Sonpur, Boudh and Athmalik. Nandankanan is the first captive breeding centre where captive breeding of this species was successful in the year 1980.

The habitat of **Estuarine crocodile, *Crocodylus porosus***, (Oriya: Baula Kumbhira) experiences tidal inundations every day. Adapting to this situation, porosus collects earth and vegetation from the surrounding and constructs a nest mound. While the mound provides a safe place to deposit the eggs at the top, the scooped out surrounding



Giant *Crocodylus porosus*



Estuarine crocodile young female guarding the nest from the top of the nest mound



Estuarine crocodile old female guarding the nest at the foot of the nest mound

get filled with tidal water and provide the mother a wallow from where she can guard the nest from predators like wildboar and monitor lizard. The mother may be seen using upto four wallows surrounding the nest. The depth of a wallow depends on soil conditions.

During the nesting season of *C. porosus* (mid May to early August), water monitors (*Varanus salvator*) are very active in groups. One or two from the group engage in distracting the attention of the nest-guarding crocodile, taking her away from the nest, while the others quickly open the nest and consume the eggs. Some may carry a few of the eggs to their tree holes.

In the Mangrove ecosystem of Bhitarkanika, the mother crocodile collects leaves of aquatic fern 'Kharakhari' (*Acrostichum aureum*), Hental (*Phoenix paludosa*), etc. and twigs from the surrounding to construct the nest. Nests average 80cm in height and 2m in diameter. The proportion of mud in the nest-mound increases if vegetable matter is scarce. Nests built only with *Acrostichum* leaves are larger than the nests built with *Phoenix* or other mangrove species.

The mother crawls out of the creek into the vegetation and identifies a place that has the required nesting material and receives some amount of sunlight for maintaining a perfect blend of temperature and moisture within the rotting vegetation that houses the clutch of eggs for incubation.

It is a very labourious process for the mother *porosus*, weighing around 100kg to 200kg, when she uses her hind limbs and tail to construct the nest mounds. So, the mother prefers to repair the nest constructed the year before. Under 'grow and release operation' in Crocodile Conservation, in order to identify potential nesting sites for collection of eggs before the onset of any nesting season, scientists follow crocodile trails leading out of water to locate open spaces and old nests in the mangroves. A mother *porosus* abandons an old nest in favour of a new nesting site if she suspects disturbance caused by humans.

The central spherical egg chamber of the nest may have only two to ten eggs if it is a maiden clutch. Normally, an average clutch contains about 50 eggs, and the largest clutch holds upto 75 eggs. The eggs range with 74x48mm to 82x56mm (length x breadth) and weigh from 90 to 137gm.

The temperature within the egg chamber of the nest remains lower than the outside temperature during the day and higher at night. The mean temperature of the egg chamber is 31.5° C. Incubation period varies from 75 to 90 days.

Like other crocodilian species, when the young are ready to hatch, they croak in response to loud noise or movement near the nest. The female opens the nest and the young ones are carried in the mouth to the nearest water for release.

The croaking call of the young ones help them to remain together and such nursery clusters are looked after by the mother crocodile for nearly a week. Hatchlings measure 26 to 31cm in total length at emergence and weigh about 75gm.

As a result of the crocodile conservation programme launched in the year 1975, with assistance from Government of India, Food and Agriculture Organisation and United Nations Development Programme, the Saltwater Crocodile population in Bhitarkaika has increased about 14-fold, and the nesting effort has increased by nearly 8 times over seven to eight nests located in mid-1970s. At present, the population of *Crocodylus porosus* is the largest in India. The only other *porosus* populations in India are in the Sundarbans of West Bengal and the Andamans.

Orissa is a destination-delight for naturalists keen to watch and study reptiles. Almost the entire spectra of reptiles— the crocodilians, the turtles, the lizards and the snakes hold their niche in a wide range of habitats. No other Indian state holds marine turtles, all three species of crocodilians, the variety of monitor lizards and the snakes and other Reptilian diversity that is so characteristic of the state.

The **Water Monitor, *Varanus salvator* (Oriya: Pani Godhi)**, seen in good numbers in Bhitarkanika, is the largest Indian Lizard that attains a body length of about 2.5m, and, if seen at the water's edge, may be mistaken as a crocodile from a distance. It is well adept to dive, swim and catch fish from water. To lay the eggs, the *salvator*, however, locates termite mounds away from tidal fluctuations in the month of June. Sometimes the termite mound containing the monitor nest is close to the road or houses or in unused grassy fields.

The *salvator* mother selects and enlarges one or two of the pre-existing holes on the termite mound and use the structure as the nest-chamber. The mother scraps out soil with all four limbs to widen and deepen her way into the termite mound. The nest chamber is somewhat flask shaped, with a narrow neck and wide bottom. An average nest contains 20 to 30 eggs and the hatchlings are about 32cm long and 35gm in weight. They hatch after 270 days incubation.

The mother prefers a termite mound because she has to labour only a little to modify the existing huge structure, and the mound offers a safe place for the long period of incubation.



Nest chamber inside termite mound
(sectional view)



India's largest lizard: *Varanus salvator*

Varanus feeds on fish, shrimps, crabs, insects, frogs, eggs of birds, reptiles and crocodiles, small reptiles, chicks of birds, offal and carrion. *Varanus salvator* is one of the major predators on eggs of the Estuarine crocodile in Bhitarkanika swamps.

Water monitors are now restricted to Bhitarkanika Wildlife Sanctuary, deltaic areas of Brahmani, Baitarani, Dhamra and Mahanadi river systems, Chilika lake and other mangrove swamps of Orissa.

The Yellow Monitor Lizard, *Varanus flavescens* (Oriya: Matia Godhi) is seen in burrows and crevices in river banks or termite mounds. They may seal their burrow entrances with a plug of earth. During the wet season, when their habitat is flooded, Yellow monitors spend much of their time in water, building up large fat reserves to sustain them through the winter. The colour of this monitor lizard shows great variation, even among animals in the same area. Many individuals show red bands across the body. During the monsoon, the body colour becomes more intense.

The Yellow monitor appears to be most active during the wetter part of the year and least active in the dry winter. They reach a length of about 100cm and weight about 2kg. Males do not grow appreciably larger than females. Sexual maturity is reached at about 58cm body length. Mating takes place in June-July. An average clutch contains about 16 eggs (maximum of 30) laid from August to October. There is no evidence that they lay eggs in termite mounds. Eggs are deposited in burrows in elevated areas to avoid the possibility of nest flooding. Incubation period is eight to nine months. Hatchlings measure about 30cm at the time of hatching. This species is seen all over the state of Orissa.

The Common Indian Monitor, *Varanus bengalensis* (Oriya: Sorishia Godhi) is more terrestrial than aquatic. Female *bengalensis* digs a hole of about 30cm deep and lays the eggs in it. The clutch size varies from 10 to 30 eggs, perhaps linked to the age and size of the monitor. The hole is refilled with soil and compacted down with the snout. A few false pits, dug by the female monitor are seen near the actual nest pit.

Reports also exist that *V. bengalensis* may lay eggs in termite nests and close the hole with leaves and rubbish. Incubation period is 8 to 9 months. The newly hatched young ones are commonly seen at the beginning of the monsoon. This species is seen in a variety of habitats including the mangrove swamps. The species is threatened mainly due to killing for skin and to a lesser extent for meat. Monitor skin is usually used for making musical instruments like the 'Khanjani'.

The Garden Lizard, *Calotes versicolor* (Oriya: Endua) is the most familiar lizard, and also called 'blood sucker' because during the breeding season, that lasts from April to September, the male lizard, when excited, develops a brilliant crimson colouration of the throat.



Female Garden lizard digging the nest pit



In the act of egg-laying

The female deposits the eggs in a hole dug by her in soft soil in any open area. Being the most common lizard in our surroundings, it is possible to watch the lizard when it digs a nest pit, lays the eggs and covers it back. It takes the lizard about an hour to dig the nest hole. The clutch size ranges with 10 to 24 eggs. Laying of eggs is a slow process, lasting about 30 minutes. After all the eggs are dropped into the nest pit, the soil is drawn back into the nest with the forelimbs and compacted with the snout. Incubation period varies from 35 to 48 days, depending on temperature in the nest chamber. The size of the eggs increases with progress in embryonic development. Hatchlings measure 72 to 76mm in total length. They attain sexual maturity in 9 to 12 months, and commence breeding the following year.

The **Indian Chameleon, *Chamaeleon zeylanicus* (Oriya: Bahurupi Endua, Pihula Endua, Kua Sapa)** is well known for its ability to change colour in response to a variety



Chameleon



Chameleon eggs

of stimuli. Breeding season commences in the rainy season when both the male and female become territorial. During October, the female digs the nest pit on soft sand with its fore limbs. The nest is an oblique burrow, about 22cm deep, 9cm in diameter at the mouth. A clutch may contain 20 to 40 eggs, each measuring 15-22mm in length, 9-12mm in width and 1.0-2.0gm in weight. After laying the eggs, most females in captivity die within 40 days. Incubation period varies from two and half months to approximately nine months. Young chameleons measuring 30mm hatch after a prolonged incubation, in the month of June-July when tiny insects are available in plenty. Chameleons are common in the state of Orissa.

The Common Indian House Gecko, *Hemidactylus flaviviridis* (Oriya: Jhitipiti) lay 3-5 eggs in March-April in all kinds of places in the house—, within stacks of clothes, in spaces between books, crevices close to lamps, etc. The eggs are 9-14mm in diameter and take 33 to 54 days to hatch out the young that is 55mm in length. In about 3-4 months the hatchlings attain adult size and are ready to breed in a year.

The Little skink, *Mabuya macularia* (Oriya: Champei Neula) are oviparous. Females lay three to four eggs during the rainy season in the forested areas with well wooden vegetation as well as in the fringes of cultivation. Common or Brahminy skink (*Mabuya carinatus*) are ovoviviparous.

The uterine eggs average 15 x 10 mm. Up to eighty young are borne in one litter which are seen in late summer or early rainy season. Other skinks whose nests have been recorded in Orissa include the snake skink (*Lygosoma punctatus*). It is distinguished by the red colour of the juveniles.. It is very widely distributed and spends most of its life underground, often under leaf litters.



Little skink at its egg-laying site

King Cobra or Hamadryad, *Ophiophagus hannah* (Oriya: Ahiraja, Jhar Kalua), the largest poisonous snake in India is predominantly a snake-eater, and is the only snake species that makes nest for incubation of its eggs.

In the month of April, the female starts building the nest in a secluded place. With a loop of the body, the female collects leaves and pile these up at the selected site. The nesting female in Bhitarkanika may add moist soil/mud to the heap of leaves from different mangrove species.



King Cobra at the nest

The female makes circular movements within the heap of leaves and soil and carves out a nest chamber. The female may carry a bunch of leaves in a loop of the body held about two inches above the ground. It takes about three-four days to complete a nest.

The eggs are laid in the central chamber and covered almost completely with a layer of litter, and the female coils on top of the leaf-covered clutch. The eggs, measuring about 6.0 x 3.5 cm and weighing about 40.0 gm, are laid five to six weeks after mating. Up to 51 eggs may form a clutch. During incubation, the eggs increase in size, and after about 10 weeks the little snake emerges out when they are about 50 cm long.

King cobras are restricted to dense forests either in the hills or the estuaries. Bhitarkanika, Similipal, Satkoshia, Sunabeda and forests of Koraput are some of the best abodes for King Cobra. Due to smuggling of live snakes for demonstration as well as extraction of anti-venom purpose, the population of King Cobra is under threat.

FRESHWATER TURTLES dig a burrow-nest on the ground and lay the eggs in it. The nests and the nesting season vary in minor details, as do the eggs and the habitats occupied by these. The Indian Tent Terrapin, *Kachuga tentoria* and *Kachuga tecta* (Oriya: **Katha kainchha**) are the common hard-shelled freshwater turtles of rivers Mahanadi, Brahmani, Kharasrota, Luna, Chitrotpala, etc. They nest during October to January, with local variations linked to temperature. Winter doesn't favour nesting. Eggs are oblong, 4-5cm long. Two clutches of four to ten eggs are laid per season. Eggs are predated by Monitors, Jackals etc. Incubation is from five to eight months and eggs laid early in the season remain dormant till the ambient temperature rises to 300 C. Sometimes these terrapins get caught in fishing nets and drown to death.

The Indian Snail-eating Terrapin, *Melanochelys trijuga* (Oriya: Kala kainchha) found in Similipal and captive-bred at Ramatirtha in Mayurbhanj lays around 11-14 eggs in September-October in a burrow. The young terrapins hatch during March-April.

The Indian Mud or Flap-Shell Turtle, *Lissemys punctata* (Oriya: Panka kainchha) is soft-shelled and attains a carapace length of about 35cm and weigh about 5.2kg. Male *punctata* is about 10cm in length. Distinct skin flaps on the plastron allow hind



Indian Flapshell Turtle



Kachuga tecta

limbs and the tail to hide underneath. Commonly known as the pond turtle, it makes a burrow nest on the banks of river, lake, reservoir, canal, pond, cultivation field, etc. Usually the eggs are laid and hatched during the rainy season. Clutches of about 10 eggs are buried in the moist soil. Eggs are spherical, hard-shelled, and measure 25 to 33 mm in diameter. The carapace of hatchlings measure about 44x34 mm.

The **Chitra Turtle**, *Chitra indica* (Oriya: **Chitra kainchha**) nests from August to September. The nests are flask-shaped holes dug in sand or sandy loam, 80 to 135cm above the river level. Eggs are spherical, translucent with an average weight of 10.5g and 27.0mm diameter. Clutch size varies from 25 to 60 eggs, and the incubation period is 40 to 70 days. Hatching takes place in October and early November. The hatchlings are extraordinarily small with a recorded carapaces size of 3.0 x 3.5cm and are bright olive green. Now, Chitra turtles are seen in the Mahanadi river system of Orissa and near Naraj in particular.

The **Ganges Softshell or Indian Softshell Turtle**, *Aspideretes gangeticus* (Oriya: **Chabeda kainchha**) bury their eggs in moist soil close to water source (ponds, reservoirs, rivers etc.) The clutch size varies from 13 to 15 eggs. The eggs are said to be perfectly spherical 2.5 cm in diameter. Incubation period about 250 days is reported in one instance. Females can store viable sperms up to 13 years. *A. gangeticus* has become endangered on account of excessive killing of the adult for its flesh and over exploitation of eggs for food. These are seen in Mahanadi and Brahmani river systems. The species have settled in temple ponds of Maneswar (Sambalpur District) and village ponds in Buguda block of Ganjam District. The **Indian Peacock soft shell turtle**, *Aspideretes hurum* is markedly similar to *Aspideretes gangeticus* and is mainly seen in the lower reaches of Mahanadi river system.

The **Asian Giant Soft-shelled Turtle**, *Pelochelys bibroni* is the only softshell turtle from India which often enters into sea. *Pelochelys* are seen in Brahmani (Patsala), Baitarani, Dhamra, Kharasrota and Subarnarekha river systems, Gahirmatha coast of Bhitarkanika Wildlife Sanctuary in Kendrapara district and Kujang area of Jagatsinghpur district. It is seen nesting in the sea beaches at Ekakula sharing the same nesting beach of Olive



Chitra indica



Aspideretes gangeticus

ridley sea turtles but the nesting locations of the two species are spatially separated at finer details. The reproductive biology of the species is poorly known. Clutch size varies from 20-28, egg diameter 30mm. Nesting takes place between December to March and is similar to that of other estuarine species like *Batagur baska*. It is reported to nest more than once in a nesting season. Like marine turtles it is also known to dig a body pit prior to making a nest hole.

The Starred Tortoise, *Geochelone elegans* lays eggs, in clutches varying in number from 3 to 7 in a pit dug by the female with her hind feet in the moist soil. Once egg laying is completed and compacted down by the mother, the egg hole area becomes indistinguishable from the surrounding soil. Clutches have been laid in March, April, June, October and November. A female may lay more than one clutch in a season. The hard-shelled eggs are ellipsoidal white, matt-surfaced and range in size from 40 x 35 to 51 x 37mm. Incubation may take from 50 to



Star Tortoise

140 days for eggs of the same clutch. It takes about twenty-four hours for the young to surface after hatching. The yolk sac is external at birth, but is usually absorbed in to the body within 48 hours. The hatchling is provided with egg tooth for breaking the shell. Within a week after hatching, the young start feeding, on the same food as the adult. Maturity is attained in about two years. Star tortoises have been collected from Ganjam District. Another land tortoise, *Geochelone elongata*, is known from forests of Nayagarh, Mayurbhanj and Sambalpur.

The Olive Ridley sea turtle (*Lepidochelys olivacea*) Olive ridleys are the smallest of all sea turtles and the only species of sea turtles which nest in Orissa's coast line. The species has both solitary as well as mass nesting strategies. Through out its circumboreal



Solitary nesting of Olive Ridley sea turtle



Oviposition

range, the species nests solitarily on suitable sandy stretches. However, in some selected remote locations very large nesting congregations involving hundreds and thousands of individuals take place for synchronised nesting. This nesting strategy is popularly known as *arribada* or *arribazones* (a Spanish term meaning 'mass arrival').

There are three mass nesting beaches in Orissa viz; Gahirmatha rookery (Dhamra river mouth) and the rookeries at Devi river mouth and Rushikulya river mouths. In the rookeries at Devi river mouth and Gahirmatha small number of turtles emerge almost throughout the year for nesting.

Olive ridley is normally a nocturnal nester, but instances are known of the females coming ashore well before sunset and also after sunrise to lay. During mass nesting period in some years, diurnal nesting has been observed where mass nesting of olive ridleys has taken place continuously both during the day and night time uninterruptedly. Mass nesting usually takes place two times a year; the first one during late December to March and the second one in March or April months. In some years there may be only one or may be no mass nesting at all.

A body pit is usually dug by using all the front and hind flippers before digging the nest hole proper. In this process, dry unconsolidated sand is removed from a much larger area. Soon after completion of the body pit, actual nest is dug with alternate movements of both the rear flippers. A completed nest looks like a flask shaped chamber with a narrow mouth and neck, and a much wider bottom. Most of the eggs get fit in the wider bottom part of the nest. Eggs are round, leathery and resemble a table tennis ball or ping pong ball. The clutch varies from 40 to 180 (egg diameter 35 to 38mm, weight 25 to 34g).

The turtle, after oviposition and filling the nest hole, packs the nest by turning and tamping with the body. It also smoothes as well as camouflages the nest site by vigorously throwing sand backwards in a much larger area. This makes it difficult for the sight oriented predators and poachers to locate the exact nest site. The incubation period varies from 45 to 70+ days and is temperature dependent. After hatching, the young ones take further 1 to 3 days to emerge from the sand.

During the 'Zamindari period', a large number of eggs used to be collected from Kanika (Gahiramatha) and Kujang areas and were marketed in Calcutta. After vesting of Zamindari, Forest Department was also issuing licenses @ Rs.15/- only for collection of boatload of olive ridley eggs, each boat containing on an average 1,00,000 eggs. Thus, there was about 100% exploitation of eggs. This practice has been completely banned after enactment of the Wildlife (Protection) Act, 1972 and its enforcement in the state in 1974. After declaration of Bhitarkanika Wildlife Sanctuary in 1975 the law relating to collection of eggs has been more rigidly enforced in the state by the wildlife organisation of the state Forest department.

Major threat to the Olive ridley is through heavy 'incidental catch' by shrimp trawlers that continue operations in the breeding grounds of turtles in front of the Gahirmatha Mass nesting beach. Turtles coming to the Orissa coast for nesting need more and effective protection in the coastal waters and in the high seas.



Mass Nesting



Emergence of turtle hatchlings

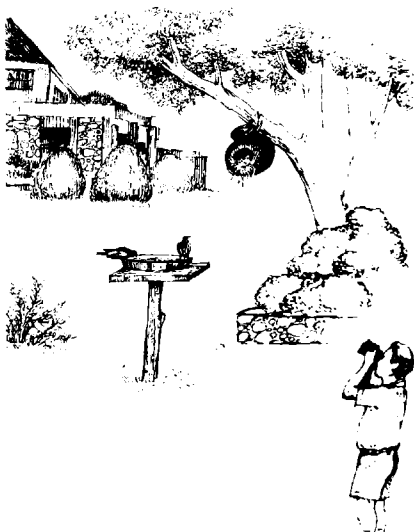
ON MAKING A NEST-FRIENDLY GARDEN



Having got a bird's eye-view of the fascinating world of nesting animals, it is but natural that the interested reader will feel an urge to witness first-hand, some of the nests described here in this book. Here, in this section we shall see how one can do just that, by making our gardens, back-yards and homesteads more nest-friendly.

The first and foremost aspect is to make the garden simulate a natural habitat – it should provide a safe, conducive and natural environment for the nesting animals, basically by meeting food, cover and nesting requirements. This is best done by leaving a portion of the garden wild and untended; manicured lawns and pruned bushes are aesthetically pleasing, but make poor nesting habitats ! In addition, to improve the general nesting ambience, one can try out the following steps:

- Planting of shrubs and trees with large leaves: They provide excellent nesting sites for the Tailor Bird. *Michelia champaca* (Oriya: Champa) and *Ficus hispida* (Oriya: Pani Dimiri) are preferred species.
- Fixing a few earthen pots and wooden nest-boxes on to trees or bamboo clumps: A number of birds love raising their brood in these artificially created readymade nests. They include Magpie Robin, Common and Jungle Mynas, House Sparrow and even the Spotted Owllet.
- Choosing some large leafy and bushy shrubs a small trees which branch profusely: Not only do they provide foliage for cover and shade but they also give nesting sites to a number of birds like the Spotted Dove, Bulbuls etc. as also the 3-striped Palm Squirrel. *Zizyphus mauritiana* (Oriya: Barakoli), *Croton sp.*, *Adathoda vasica* and *Phlogocanthus sp.* are suitable species.
- Planting a few soft-wood species with thin barks: For primary hole-nesters like Barbets and Woodpeckers it is easy to drill nest-holes. Two suitable species are *Moringa oleifera* (Oriya: Sajana) and *Ailanthus excelsa* (Oriya: Maharukha).



- Providing a couple of bird-baths: Any shallow earthen/concrete basin mounted on a stand or placed in the ground will make the garden a favourite place for birds during summer months and will induce them to nest in the immediate vicinity.
- Keeping a bird feeding-table and providing an assortment of feed once daily. Food is a guaranteed source of attraction to birds.
- Leaf-litter from at least a part of the garden should be left as such. In addition, if some sandy soil and a few large fallen logs can be provided, garden lizards and skinks will love to dig their nest-holes there.

All this sounds lot of work, but doubtlessly, the little trouble that we take to make our surroundings more nest-friendly will be more than compensated by the pleasure we will ultimately derive by watching the wonderful world of nesting animals unfold before our very eyes - say a tiny Tailor Bird sewing together Champa leaves to craft her green mansion, a thing of exquisite beauty and a marvel of nature !

